Series 1958, No. 2 Issued June 1961

SOIL SURVEY

Loudon County Tennessee

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
TENNESSEE AGRICULTURAL EXPERIMENT STATION
TENNESSEE VALLEY AUTHORITY

HOW TO USE THE SOIL SURVEY REPORT

THIS REPORT on Loudon County will help you plan the kind of farming that will protect your soils and produce good yields. It describes the soils, shows their location on a map, and tells what they will do under different kinds of management.

Find Your Farm on the Map

To use this survey, start by finding your farm on the soil map that is at the back of this report. This is a large map of the county, on which you can see towns, roads, streams, and many other landmarks. The index to map sheets will help you locate your farm; it shows what part of the county is on each sheet of the soil map.

Learn About Your Soils

Each kind of soil mapped in the county is identified on the soil map by a symbol.

Suppose you have found on your farm an area marked with the symbol FcC. You learn the name of the soil this symbol represents by looking at the map legend. The symbol FcC identifies Fullerton cherty silt loam, sloping phase. To learn how this soil looks in the field and what it can be used for, turn to the section, Descriptions of Soils and Land Types, and read the description of the Fullerton series and of Fullerton cherty silt loam, sloping phase.

After you have read the description of the soil, you may want to know what crops it is best suited to and how much it can be expected to produce. For suggestions about crops and rotations, turn to the section, Use, Management, and Estimated Yields, and read what is said about the soils of capability unit IIIe–3, the unit in which Fullerton cherty silt loam, sloping phase, has been classified. To find out what yields you can reasonably expect, turn to table 1, under the heading, Estimated Yields.

The Guide to Mapping Units, Capability Units, and Woodland Suitability Groups, which is at the end of the report, will simplify use of the map and the report. This guide gives the map symbol for each soil, the name of the soil, the page on which the soil is described, the capability unit, the page on which the capability unit is described, the woodland suitability group, and the page on which the woodland suitability group is described.

Make a Farm Plan

Study your soils, see whether you have been cultivating any that do not usually produce good yields, and compare the yields you have been getting with the estimates of possible yields from the same soils. Then decide whether or not you need to change your methods of farming. The choice, of course, must be yours. This report can help you make a new farm plan. It does not provide a plan of management for your farm or any other single farm in the county.

If you want help in making a farm plan, consult representatives of the Soil Conservation Service or the county agricultural agent. Members of your State experiment station staff and others familiar with farming in your county will also be glad to help.

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The fieldwork for this survey was completed in 1958. Unless otherwise specifically noted, all statements refer to conditions at the time of the survey.

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Contents

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SOIL SURVEY OF LOUDON COUNTY, TENNESSEE

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UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH THE TENNESSEE AGRICULTURAL EXPERIMENT STATION AND THE TENNESSEE VALLEY AUTHORITY

LOUDON COUNTY is in the southeastern part of Tennessee (fig. 1). All of it is in the Great Valley of eastern Tennessee. The total land area is 151,323 acres, or approximately 236 square miles. The county is bordered by Roane County on the west and north, Knox and Blount Counties on the east, and Monroe and McMinn Counties on the south. The Clinch River forms a part of the northern boundary. Loudon, the county seat, is located on the bank of the Tennessee River near the center of the county.

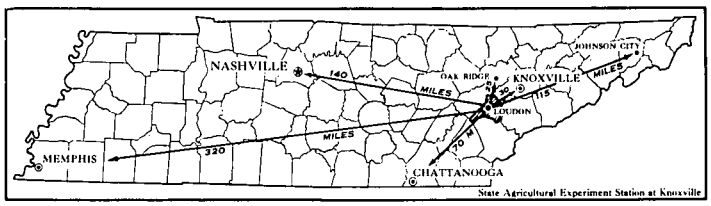

Figure 1.—**Location of Loudon County in Tennessee.**

General Soil Map

By drawing lines around the different patterns of soils on a small-scale map, a map of the general soil areas of a county may be obtained. Such a map is useful to those who want only a general idea of the soils, or who want to compare different parts of a county, or who want to locate large areas suitable for some particular kind of agriculture or for other use. It is of help in planning on a community or county level.

The eight general soil areas of Loudon County are shown on a colored map at the back of this report. Each main area, or association, is distinguished from the others by the kinds, proportions, and patterns of soils peculiar to it. Most of the large soil areas extend in a southwest-northeast direction, because they generally follow the geologic formations. The soils in any one area are not necessarily similar. They may be quite different.

AREA 1

LIGHT-COLORED, CHERTY SOILS ON HILLY AND STEEP UPLANDS: FULLERTON-CLARKSVILLE-BOLTON

This area is in six separate tracts and has an acreage that totals about 42 percent of the area of the county. It is by far the largest of the general soil areas. It is characterized by a great mass of irregularly shaped hills that have fairly narrow tops and long, moderately steep to steep side slopes. There are small, nearly level to undulating areas in draws, along streams, and in depressions (figs. 2 and 3).

Fullerton soils occupy about two-thirds of the acreage of area 1. They are well-drained, cherty, upland soils that have a yellowish-brown surface soil and a yellowish-red subsoil. Clarksville and Bolton soils occupy a small part of the uplands. Clarksville soils are very light colored, steep, and cherty. They are mostly in forest. Bolton soils are deep, well-drained, red soils that are normally on steep east- and north-facing slopes. They are moderately permeable and productive. Small acreages of Dewey and Decatur soils, which are red and highly productive, also are in the uplands. All the upland soils have developed from dolomitic limestone.

Minvale, Landisburg, and Greendale soils are in small tracts on foot slopes and narrow strips along small drainageways. All of these soils have developed from materials washed from the surrounding Fullerton and Clarksville soils. Minvale soils are well drained and have a yellowish-brown surface soil and a yellowish-red subsoil. Landisburg soils are yellowish brown and moderately well drained. Greendale soils are well drained. They consist of yellowish-brown to brown silt loam throughout.

A small part of this area consists of first bottoms occupied by Huntington, Lindside, Lobelville, and Melvin soils. Huntington soils are well drained, Lindside and Lobelville are moderately well drained to somewhat poorly drained, and Melvin soils are poorly drained.

Most of the soils in area 1 are strongly acid. The soils on the uplands are very low in natural fertility; those on the bottom lands and foot slopes are low to moderately high in fertility.

Use.—An estimated 70 percent of area 1 is cleared. Small general farms predominate. Tobacco is the main cash crop. Corn, small grains, and hay are grown chiefly for use on the farm. Beef and dairy cattle are important on some of the larger farms, and the number of dairy farms is increasing. Crop yields are generally low, and a substantial acreage is idle.

The wooded tracts are small and widely distributed, but they total about 40 percent of the woodland in the county. The largest tracts are in the steepest and most cherty parts of the area. The forest cover is predominantly yellow pine (shortleaf and Virginia) in some places and

[1] In charge for a part of the time that fieldwork was in progress.

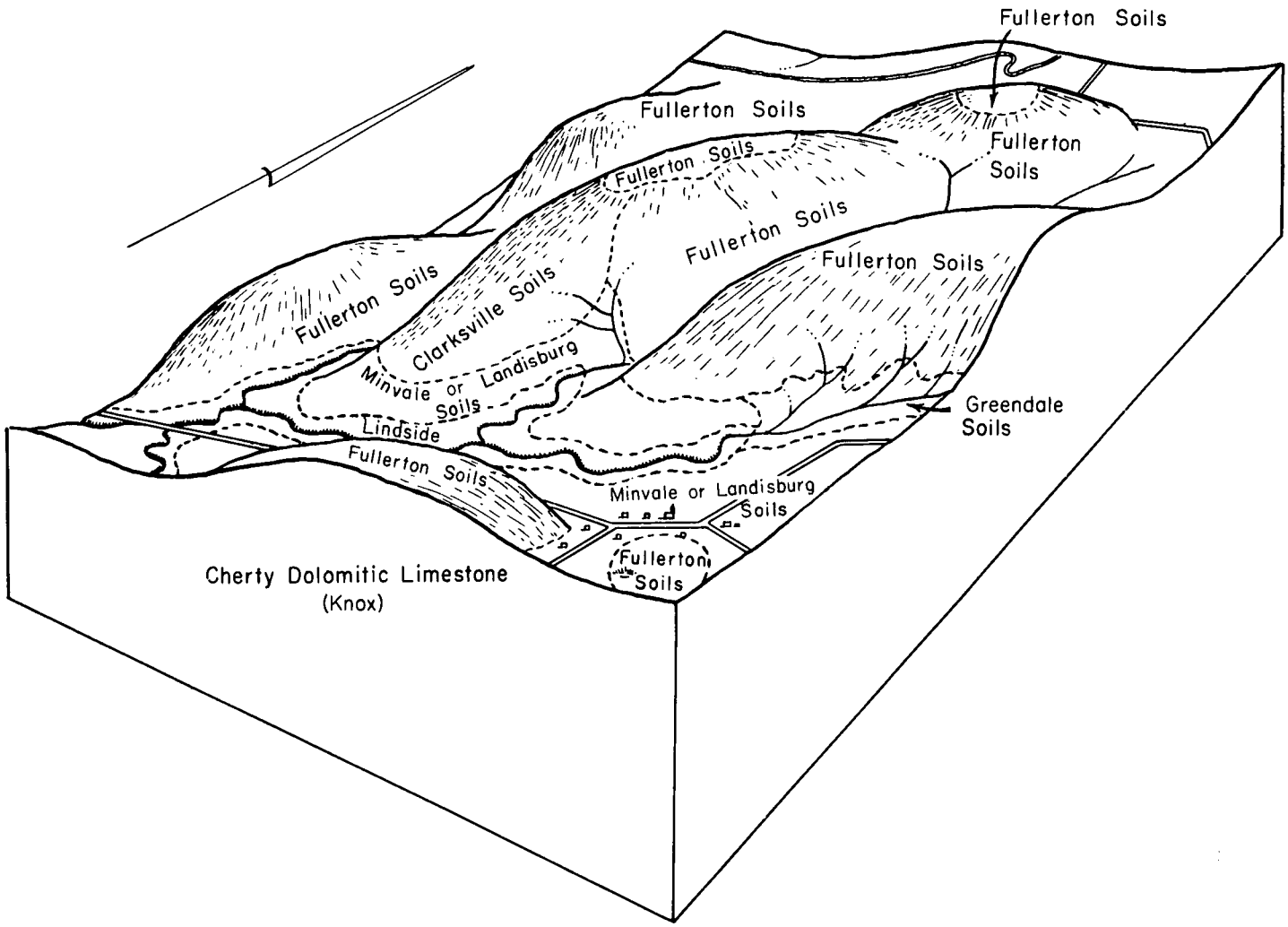

Figure 2.—**Diagram showing distribution and pattern of soils in area 1.**

a mixture of yellow pine and upland hardwoods in others. White oak, black oak, scarlet oak, southern red oak, post oak, hickory, red maple, and blackgum are the principal hardwood species. On the lower slopes, white oak, yellow-poplar, black cherry, blackgum, and red maple predominate. Dogwood, eastern redcedar, black locust, and red elm are scattered throughout the stands.

Figure 3.—**Scene in the Fullerton-Clarksville-Bolton area; cherty Greendale soil between building and steep eroded slopes.**

Suitability.—Area 1 has a fairly high agricultural potential. On a large proportion of the acreage, cultivated crops can be grown successfully, although medium to long rotations are usually necessary. Most of the acreage not suitable for cultivated crops is fair to good for pasture. Probably about 20 percent of the area is so steep and cherty that it should be kept in forest.

Although the soils are not productive in their natural state, they respond to good management. They are suitable for a wide variety of crops if the crops are grown in suitable sequence and heavily fertilized. These soils are erodible but less so than other soils in the county. Most of the acreage has moderate amounts of chert fragments, which may hinder tillage somewhat, but only a small part is so cherty that tillage is precluded.

AREA 2

MIXED LIGHT-COLORED, CHERTY SOILS AND RED SOILS ON ROLLING AND HILLY UPLANDS: FULLERTON-GREENDALE-DEWEY

This area occupies five separate tracts and covers about 11 percent of the total acreage of the county. It consists

mostly of rolling and hilly upland soils underlain by dolomitic limestone.

The relief is very irregular and is modified in some places by depressions and sinks. Most of the drainage water empties into these depressed areas; there are few surface streams.

The soils in this area are slightly less permeable than those in area 1. The natural fertility ranges from low to moderate. Nearly half of the acreage has moderate amounts of chert fragments on the surface but generally not enough to prevent tillage.

Fullerton and Dewey soils make up most of the acreage. They are of about equal extent. The Fullerton soils are deep, well drained, and, for the most part, moderately cherty. Their surface soil is yellowish-brown silt loam or cherty silt loam, and their subsoil is yellowish-red silty clay loam to clay. The Dewey soils also are deep and well drained, but they have a brown silt loam or silty clay loam surface soil and a red clayey subsoil.

Minvale and Hermitage soils are on foot slopes and benches immediately below the upland slopes. The Minvale soils resemble the Fullerton soils, and the Hermitage resemble the Dewey. However, the Minvale and Hermitage soils are younger and more productive than the Dewey and Fullerton soils. They have less clay in the subsoil and supply more moisture.

Emory and Greendale soils are in the depressed areas and most of the narrow strips along lateral drains. They are deep, well drained, and productive.

Huntington, Lindside, and Melvin soils occupy the small areas of bottom land that are included in this area. The Huntington soils are well drained, the Lindside are imperfectly drained, and the Melvin are poorly drained.

Use.—Most of the acreage has been cleared and is now used for many kinds of crops and pasture. Dairy farms are important in this area, but general livestock farms are more numerous. There is a substantial number of part-time farmers. Corn, small grains, hay, and pasture are the chief crops. They are produced mainly for use on the farms. Tobacco is the principal cash crop.

About 30 percent of the woodland in the county is in this general area. The species are the same as in the stands in area 1. Moisture conditions are more favorable than in area 1; consequently, the hardwoods are more vigorous, the moist-site species are more abundant on the lower slopes, and the undergrowth of grapevine, dogwood, redbud, and huckleberry is heavier. Shortleaf pine and Virginia pine occur in varying proportions intermingled with the hardwoods, and a few, small, pure stands of one or the other occur on the higher slopes.

Suitability.—The choice of enterprises and crops is broad in this area. Most of the acreage is suitable for crops grown in rotations, and all common crops can be grown. Most of the small proportion that is not suitable for tilled crops, because of steep slopes or chertiness, is good for pasture. The light-colored soils of the uplands are very low in fertility, but they respond well to fertilization and good management.

This area is well suited to dairying and raising beef cattle. Most of the farms consist largely of soils well suited to hay and pasture but, because of the erosion hazard, less well suited to grain. Controlling erosion is a little more difficult than in area 1 because more of the soils have clayey subsoils and slower permeability.

AREA 3
MAINLY ROLLING TO HILLY SOILS OVER ACID SHALES: SEQUOIA-LITZ-LINDSIDE

This area is in seven separate tracts and covers about 10 percent of the total acreage of the county. The individual tracts are in long, narrow valleys between high masses of limestone soils.

The area is dominantly rolling to hilly. It consists of low hills that have moderately smooth tops and moderately strong side slopes and of narrow, nearly level strips along drainageways (fig. 4). Most of the areas along the drainageways are imperfectly drained; almost all of the acreage on the uplands is well drained.

The depth of the soils ranges from only a few inches to 30 or 40 inches. On about half of the acreage, the depth to the shaly bedrock is less than 20 inches; on most of the rest, it is 20 to 36 inches. The natural fertility is low. The Sequoia and Litz soils are strongly acid; the Lindside soils are slightly acid to neutral. The drainage pattern is well defined, and there are many small, perennial streams.

Sequoia soils, which are moderately deep to bedrock, generally occupy the broader, smoother areas on the hilltops. They are well drained and have a yellowish-brown silt loam surface soil and a yellowish-red, firm silty clay subsoil.

Litz soils, which are shallow over bedrock, occupy almost all of the side slopes. They are well drained and consist of yellowish-brown silt loam or silty clay loam from the surface to the shaly bedrock.

Extending out a short distance from the base of some of the upland slopes are smooth, benchlike areas or foot slopes; these areas are normally occupied by Minvale and Leadvale soils. These are both colluvial soils, but the Minvale soils are well drained and have a brown surface soil and a reddish subsoil, while the Leadvale soils are moderately well drained and have a brown surface soil and a yellow subsoil.

The narrow first bottoms that meander through the area are occupied chiefly by Lindside and Melvin soils. The Lindside soils are moderately well drained to somewhat poorly drained, and the Melvin soils are poorly drained.

Use.—Most of this area has been cleared, but a large acreage on the stronger slopes has been abandoned and is reverting to native vegetation, predominantly Virginia pine. A large acreage has been severely eroded, and much of this is idle or in volunteer pasture. Most of the farms are small. Hay, pasture, corn, small grains, and tobacco are the main crops.

Some of the ridges and side slopes are forested, mostly with shortleaf pine and Virginia pine. Generally these grow in mixtures; on the middle slopes, Virginia pine predominates. Scarlet oak, chestnut oak, and southern red oak are minor components of the stands; generally they are low in vigor. On the foot slopes and bottom lands, the oaks are more vigorous and some of the moist-site hardwoods are found. Most of these areas, however, are used for crops or pasture.

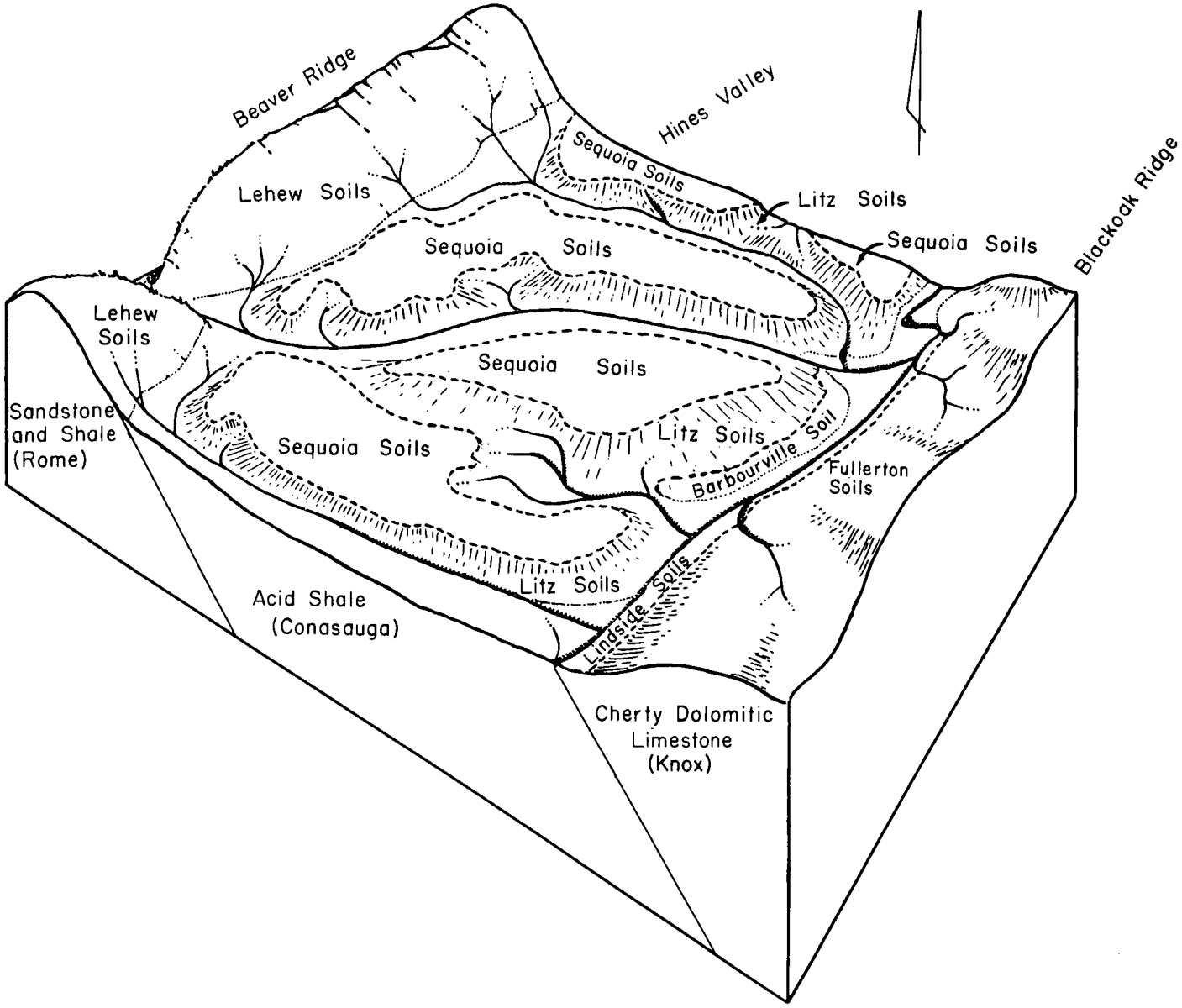

Figure 4.—**Diagram showing distribution and pattern of soils in area 3.**

Suitability.—The agricultural potential of this area is rather limited because a large proportion of the acreage is shallow, droughty, and steep. Erosion has reduced the naturally low fertility. Those parts of the uplands that are smoother and less eroded than most are, if well managed, moderately productive of pasture and the common farm crops.

Probably half of the acreage is not well suited to tilled crops, but most of this will produce fair to good pasture. A small proportion is suitable only for forest. The narrow strips along streams and drainageways are productive and suitable for intensive use, but some of these areas would require artificial drainage for high, sustained production.

AREA 4

DEEP, WELL-DRAINED SOILS WITH RED SUBSOILS ON ROLLING TO HILLY UPLANDS: DEWEY-DECATUR-EMORY

Within this area are the most productive upland soils of the county. Several small, individual belts are scattered throughout the county. They total about 15 percent of the area of the county. The soils occupy valleys and overlie noncherty, dolomitic limestone. Almost all of them are well drained and deep. Their subsoil is generally high in clay. The relief is predominantly rolling to hilly but ranges from undulating to hilly. Control of sheet erosion on the stronger slopes requires careful attention. The natural fertility is moderately high and is not difficult to maintain.

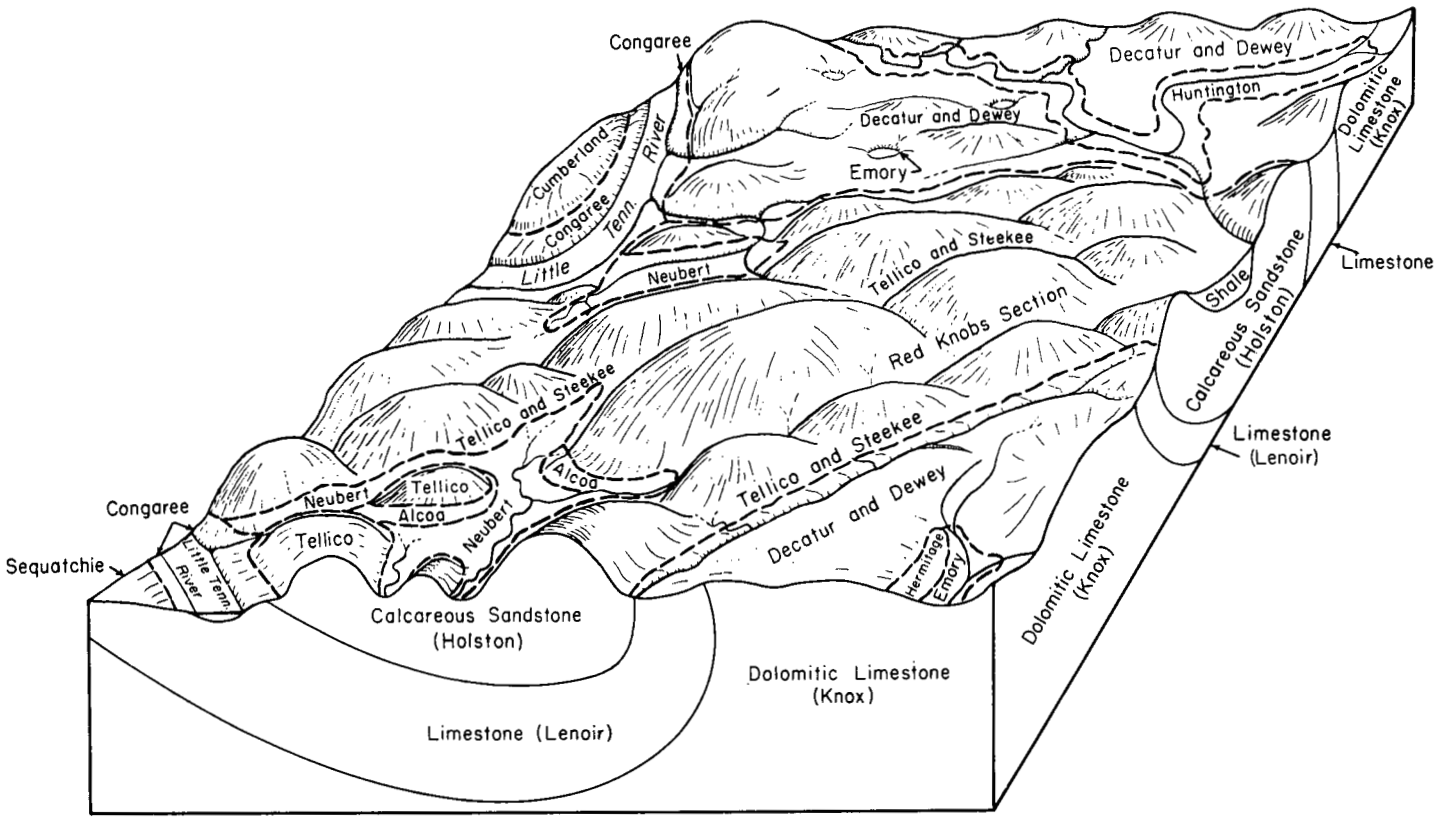

***Figure 5.*—Diagram showing distribution and pattern of soils in area 5.**

Dewey and Decatur soils are dominant on the uplands. These two soils are quite similar; both are deep, well drained, and productive. The Decatur soils are darker colored than the Dewey soils. Small areas of light-colored Fullerton soils also are on the uplands.

Emory soils, which are dark brown, deep, and productive, occupy depressions and narrow strips along drainageways.

Huntington, Lindside, and Melvin soils are on the narrow first bottoms. The Huntington soils are well drained; the Lindside are moderately well drained to somewhat poorly drained; and the Melvin are poorly drained.

Use.—Almost all of this area has been cleared, and many kinds of crops are now grown. General livestock farming and dairying prevail. Small grains, hay, and pasture crops are the principal crops. A substantial acreage of corn is also grown for grain and silage. Tobacco is the main cash crop. Some of the most productive farms in the county are partly or entirely in this area.

Only a small part of this area is in woodland. There are a few thrifty stands of loblolly pine planted during the 1930's. Also, there are a few well-preserved stands of hardwoods—white oak, black walnut, and yellow-poplar and a sprinkling of scarlet oak and southern red oak. Mixed with the hardwood trees are scattered shortleaf pines. Moisture conditions are good, and the trees are vigorous.

Suitability.—This area is well suited to livestock farming. The soils are well suited to all the common grasses and legumes. A large proportion of the acreage is suitable for the common row crops grown in medium to long rotations. Practically all of it will produce high-quality pasture.

AREA 5
WELL-DRAINED, DARK REDDISH-BROWN SOILS ON STEEP HILLS AND KNOBS: TELLICO-ALCOA-NEUBERT

This general soil area occupies three separate narrow belts and covers about 6 percent of the county. It is dominantly an area of steep to very steep hills and knobs underlain by calcareous sandstone and sandy shale. A small part of the area consists of undulating to rolling foot slopes, of benches, and of nearly level strips along streams and drainageways (figs. 5 and 6).

The soils in this area are reddish, loamy, friable, permeable, and moderately fertile. About a third of the acreage consists of shallow soils and the rest of moderately deep to deep soils. The susceptibility to sheet and gully erosion is high. Much of the acreage is severely eroded, and many small areas are gullied.

Tellico and Steekee soils occupy practically all of the ridgetops and side slopes. The Tellico soils are moderately deep to deep, red to reddish brown, friable, and permeable. The Steekee soils are similar but are generally less than 20 inches deep.

Alcoa soils are on the colluvial slopes or benches that extend from the base of the steep upland slopes. They are deep, well drained, and productive.

Neubert soils are in narrow strips along drainageways. They, also, are deep and well drained.

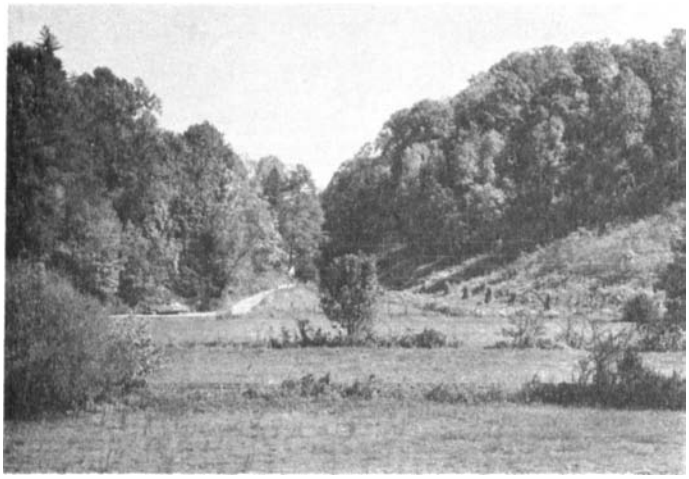

Figure 6.—Scene in the Tellico-Alcoa-Neubert area. The steep, forested slopes are Tellico and Steekee soils, and the nearly level areas are Neubert and Alcoa soils.

Huntington, Lindside, and Melvin soils make up a very small but important acreage on nearly level bottom lands. They are well drained, moderately well drained to somewhat poorly drained, and poorly drained, respectively.

Use.—About two-thirds of this area has been cleared and cropped. A large acreage has eroded severely as a result of cropping. Much has been abandoned and has reverted to forest, mainly of volunteer pine.

Most farms consist largely of cutover forest. Small, part-time farms predominate. There are a few general farms, livestock farms, and dairy farms. Crops are grown mostly on the broad ridgetops, the colluvial slopes, and the bottom lands. A few steep slopes are still used for corn and other row crops. Tobacco is the main cash crop.

The woodland is similar to that in areas 1 and 2, but the moist-site species are more abundant and grow higher on the slopes. Yellow-poplar, black cherry, black locust, and red maple are prominent on the middle slopes as well as on the lower slopes. Shortleaf pine, Virginia pine, scarlet oak, black oak, black locust, and southern red oak occur in varying mixtures on the higher slopes and throughout the remaining stands.

Suitability.—This area does not have a high agricultural potential. At least half of it is poorly suited to either crops or pasture because of steep slopes and extreme erodibility. These steep parts are productive of trees.

The small acreage that is on smooth slopes, foot slopes, benches, and bottom lands is productive and well suited to the common crops.

AREA 6

DEEP, WELL-DRAINED SOILS MAINLY ON OLD STREAM TERRACES: WAYNESBORO-CUMBERLAND-EMORY

This area covers about 13 percent of the county. Most of it is in an irregularly shaped tract that roughly parallels the Tennessee and Little Tennessee Rivers. A much smaller acreage is in the southeastern part of the county.

The area consists of high stream terraces and bottom lands (fig. 7). Most of it lies in the meanders of the streams.

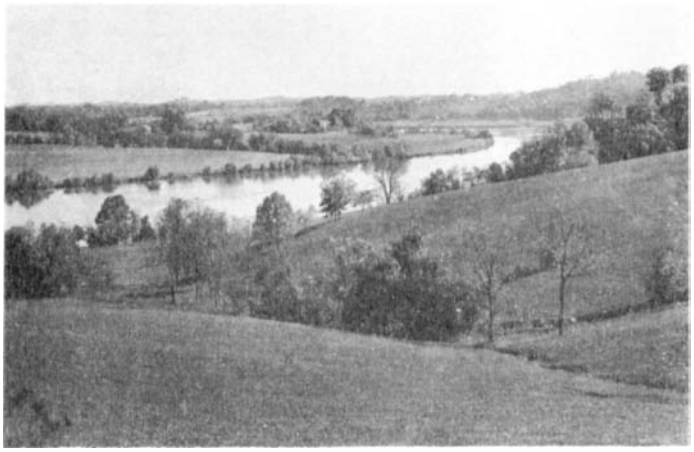

Figure 7.—Scene in the Waynesboro-Cumberland-Emory area.

The small acreage on the bottom lands is fertile and easily worked, and most of it is well drained. On the high terraces, the soils are moderate to moderately high in fertility, deep, and well drained. In a few places, cobblestones and pebbles interfere somewhat with cultivation.

Waynesboro and Cumberland soils make up most of the acreage on the high terraces. Both soils are deep and well drained. They are moderately fertile. Small, scattered tracts of Nolichucky soils are also on these terraces. They are light colored. Where the alluvial deposits are thin or have been removed, spots of Fullerton soils are exposed.

Etowah soils are on the intermediate terraces; Sequatchie soils are on the low terraces. They occupy small but important acreages.

Emory soils are along the drainageways and in small depressions where recent sediments have accumulated. They are highly productive, but the individual areas are small.

Huntington, Congaree, and Lindside soils are on the bottom lands.

Use.—An estimated 85 percent of this area has been cleared. Dairying and raising beef cattle are the most important enterprises. Corn, small grains, hay, row crops, and pasture crops are extensively grown. Tobacco is the main cash crop.

Little of this area is wooded. White oak, yellow-poplar, black cherry, and black oak predominate in the existing stands of trees. On the tops and the upper slopes of the terraces there are vigorous growths of valuable hardwoods.

A substantial acreage is in highways, railroads, suburban developments, and other nonfarm uses. Loudon and Lenoir City are located within this area. The bottom lands above Fort Loudoun Dam are flooded.

Suitability.—This area has a high proportion of productive soils and has a high agricultural potential. It is well suited to cattle raising and dairying because grain and silage can be grown on the bottom lands and hay and pasture on the terraces.

The strips of bottom land are suitable for intensive cropping. They will produce high yields of row crops and hay crops if moderately fertilized. Though less fertile than the bottom lands, the high terraces are well suited to many kinds of crops. The small acreage that is too

strongly sloping to be suited to row crops will produce good pasture.

AREA 7

ROLLING TO HILLY ROCKLAND, SHALLOW TO MODERATELY DEEP SOILS OVER CLAYEY LIMESTONE, AND NARROW BOTTOM LANDS; ROCKLAND-TALBOTT-LINDSIDE

This area forms one narrow belt that crosses the southeastern part of the county. It covers about 2 percent of the acreage of the county. The area is a rolling to hilly valley characterized by many limestone outcrops. Intermingled with extensive areas of rocky land are small areas of shallow to moderately deep soils that are moderately fertile but droughty. The moderately deep soils have a surface soil of silty clay loam and a subsoil of plastic clay.

Rockland, Talbott, and Colbert soils make up more than half of the acreage. The small tracts of deep soils are Talbott and Colbert soils. The Talbott soils have a brown surface soil and a yellowish-red, plastic clay subsoil. They are mostly very rocky. The Colbert soils are similar but have a yellow subsoil and are shallower to bedrock.

The narrow strips along streams and drainageways and in depressions are generally occupied by Lindside soils, which are moderately well drained to somewhat poorly drained.

Use.—About half of this area is cleared. Much of the cleared acreage is used for pasture, mostly unimproved. Corn, small grains, and hay are grown in the few cultivated areas. Tobacco, the main cash crop, is generally grown on the lower parts of the slopes and along the drainageways. Small part-time farms predominate.

Suitability.—More than half of this area is too rocky to till. There is very little acreage that is suitable for tilled crops, and this is located mainly along the drainageways and on a few smooth areas in the uplands.

About one-third of the acreage is so rocky that establishing pasture would not be feasible. The small acreage of deep soils produces fair pasture, but yields are rather low because of droughtiness.

Most of the extremely rocky areas are now in forest that consists primarily of eastern redcedar.

AREA 8

SHALLOW SOILS ON STEEP SLOPES: LEHEW-BARBOURVILLE

This area covers only about 1 percent of the total acreage of the county. It forms one very narrow belt in the northern part. It consists mostly of a steeply sloping ridge with a very narrow crest. Except for small areas of colluvial soils at the base of the slopes and along the drainageways, the soils are very shallow over the acid sandy shale and sandstone bedrock. They are somewhat excessively drained and are droughty and low in fertility.

The ridge crests and the steep slopes are occupied by the Lehew soils.

The colluvial areas are occupied mainly by the Minvale and Barbourville soils, which are well drained and moderately productive.

Use.—Almost all of the acreage is in forest of Virginia pine, shortleaf pine, scarlet oak, chestnut oak, and southern red oak.

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Suitability.—Because of the steep slopes and the shallow soils, this area has little potential for agriculture. The acreage on the foot slopes and along the drainageways is suited to crops and pasture but is too small to be of value agriculturally.

Use, Management, and Estimated Yields

This section deals with the use suitability and management requirements of the soils and the yields that can be obtained under a defined level of management.

Capability Groups of Soils

Capability grouping is a system of classification used to show the relative suitability of soils for crops, pasture, forestry, or wildlife. It is a practical grouping based on the needs and limitations of the soils, the risks of damage to them, and their response to management. There are three levels of classification above the mapping unit—the capability unit, the subclass, and the class.

The capability unit, which is sometimes called a management group of soils, is the lowest level of capability grouping. A capability unit is made up of soils similar in management needs, in risk of damage, and in general suitability for use.

The next broader grouping, the subclass, is used to indicate the dominant kind of limitation. Letter symbols identify the nature of the limitation. An "e" means that the main limiting factor is the risk of erosion if the plant cover is not maintained. A "w" means that excess water retards plant growth or interferes with cultivation. An "s" means that the soils are shallow, stony, sandy, droughty, or low in fertility.

The broadest grouping, the class, is identified by Roman numerals. All of the soils in one class have limitations or hazards of about the same degree, but of different kinds, as shown by the subclass. Any class except class I may consist of one or more subclasses.

In classes I, II, and III are soils that are suitable for annual or periodic cultivation to annual or short-lived crops.

Class I soils are those that have the widest range of use and the least risk of damage. They are level or nearly level, productive, well drained, and easy to work. They can be cultivated with almost no risk of erosion and will remain productive if managed with normal care.

Class II soils can be cultivated regularly, but they do not have quite so wide a range of suitability as class I soils. Some class II soils are gently sloping and consequently need moderate care to prevent erosion. Other soils in class II are slightly droughty, slighty wet, somewhat limited in depth, or somewhat low in fertility.

Class III soils can be cropped regularly, but they have a narrower range of use than class II soils and require more careful management.

In class IV are soils that should be cultivated only occasionally or only under very careful management.

In classes V, VI, and VII are soils that normally should not be cultivated but can be used for pasture, for woodland, or for wildlife shelter.

Class V soils are nearly level and gently sloping, but they are droughty, wet, subject to damaging overflow, low in fertility, or otherwise unsuitable for cultivation. None of the soils in Loudon County is in class V.

Class VI soils are not suitable for regularly cultivated crops, because they are steep, droughty, wet, or otherwise limited, but they give fair yields of forage and fair to high yields of forest products. Some soils in class VI can, without damage, be cultivated enough so that fruit trees or forest trees can be set out or pasture crops seeded.

Class VII soils provide only poor to fair yields of forage. Yields of forest products may be fair to high. The soils have characteristics that restrict their use mainly to woodland, or, in some places, to pasture.

In class VIII are soils that have practically no agricultural use. Some areas have value for watershed protection, wildlife shelter, or recreation. None of the soils in Loudon County is in class VIII.

The classes, subclasses, and units in Loudon County are as follows:

Class I.—Soils that have few limitations that restrict their use.
- Unit I–1.—Nearly level soils on bottom lands or along drainageways; deep and well drained; very high moisture-supplying capacity; high yield potential.

Class II.—Soils that have some limitations that reduce the choice of plants or require moderate conservation practices.
- Subclass IIe.—Soils subject to erosion if cover is not maintained.
  - Unit IIe–1.—Gently sloping soils; deep, moderately permeable, and well drained; medium texture; high moisture-supplying capacity.
  - Unit IIe–2.—Gently sloping soils; deep, moderately permeable, and well drained; clayey subsoil; medium moisture-supplying capacity.
  - Unit IIe–3.—Gently sloping soils; moderately deep and well drained; clayey subsoil; medium moisture-supplying capacity.
  - Unit IIe–4.—Gently sloping soils; weak to moderate "pans" at depths of about 2 feet; moderately well drained.
- Subclass IIw.—Moderately wet soils.
  - Unit IIw–1.—Nearly level soils on bottom lands; moderately well to somewhat poorly drained.

Class III.—Soils that have severe limitations that reduce the choice of plants or require special conservation practices, or both.
- Subclass IIIe.—Soils that have high risk of erosion when tilled.
  - Unit IIIe–1.—Sloping soils; deep, moderately permeable, and well drained; medium texture; high moisture-supplying capacity.
  - Unit IIIe–2.—Sloping soils; deep, moderately permeable, and well drained; clayey subsoil; medium moisture-supplying capacity.
  - Unit IIIe–3.—Sloping soils; deep, moderately permeable, and well drained; cherty and gravelly; medium to low moisture-supplying capacity; low fertility.
  - Unit IIIe–4.—Sloping soils; moderately deep and well drained; clayey subsoil; medium to low moisture-supplying capacity.
- Subclass IIIw.—Wet soils that require artificial drainage if they are tilled.
  - Unit IIIw–1.—Nearly level soils on bottom lands; poorly drained.
- Subclass IIIs.—Soils severely limited by shallowness, stoniness, droughtiness, or low fertility.
  - Unit IIIs–1.—Sloping soils, shallow to shale or limestone bedrock; very low moisture-supplying capacity; droughty.

Class IV.—Soils that have very severe limitations that restrict the choice of plants or require very careful management, or both.
- Subclass IVe.—Soils severely limited by risk of erosion if cover is not maintained.
  - Unit IVe–1.—Moderately steep soils; deep and well drained; clayey subsoil; medium moisture-supplying capacity.
  - Unit IVe–2.—Moderately steep soils; cherty and gravelly; deep, moderately permeable, and well drained; low moisture-supplying capacity; low fertility.
  - Unit IVe–3.—Sloping and moderately steep soils; deep and well drained; clayey surface soil and subsoil; low moisture-supplying capacity.
- Subclass IVw.—Soils severely limited by excess water.
  - Unit IVw–1.—Nearly level soils on old terraces; somewhat poorly drained and poorly drained.
- Subclass IVs.—Coarse textured to moderately coarse textured soils that have severely limited capacity to hold moisture.
  - Unit IVs–1.—Moderately steep soils; shallow over shale or limestone bedrock.

Class VI.—Soils that have severe limitations that make them generally unsuitable for cultivation and limit their use mainly to pasture or range, woodland, or wildlife food and cover.
- Subclass VIe.—Soils moderately limited for pasture or trees because of risk of erosion if cover is not maintained.
  - Unit VIe–1.—Steep soils; deep over bedrock.
  - Unit VIe–2.—Steep and moderately steep soils; cherty or gravelly; deep to bedrock.

Class VII.—Soils that have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, woodland, or wildlife.
- Subclass VIIe—Soils severely limited by risk of erosion if cover is not maintained.
  - Unit VIIe–1.—Very steep soils; deep to bedrock.
- Subclass VIIs.—Soils severely limited by low moisture-holding capacity and risk of erosion.
  - Unit VIIs–1.—Steep and very steep soils; shallow; rocky land and gullied land.

Capability Units

In this subsection, the soils of Loudon County are placed in capability units, or management groups, on the basis of similarities in use suitability and management

requirements. All the soils in one capability unit need about the same management, but the response to suitable management is not exactly the same for all the soils within a unit. Some soils within a unit respond to management better than others.

The suggestions for management of the various groups of soils may not suit exactly the needs of all farmers in the county. A particular farm may have particular problems that call for a system of management different from that discussed in this section.

Capability unit I–1

Capability unit I–1 consists of deep, well-drained, medium-textured, friable soils on bottom lands or along drainageways. The slopes are predominantly nearly level but range upward to very gently sloping. A very small acreage is sloping, but the slopes are short and do not greatly affect management. Some of the bottom land along the smaller streams is flooded at times, but the floods last only for very short periods because of the high altitude and the deep stream channels. The bottom land along the Clinch, Tennessee, and Little Tennessee Rivers is normally protected from floods by dams farther upstream. The slopes range from 0 to 12 percent but are predominantly from 1 to 4 percent.

The soils in this unit are—

Barbourville silt loam.
Congaree loam, nearly level phase.
Congaree loam, sloping phase.
Emory silt loam.
Emory silty clay loam.
Greendale cherty silt loam.
Greendale silt loam.
Huntington loam, nearly level phase.
Huntington loam, sloping phase.
Neubert loam.

These soils produce high yields of general crops and pasture crops. They have high natural fertility and a very high moisture-supplying capacity. Their reaction ranges from strongly acid to neutral. They are easy to work and to conserve. Greendale cherty silt loam is a little less productive than the rest of the soils in the unit because the chert fragments interfere somewhat with cultivation.

Nearly all the acreage is used for crops. Much of it is in corn, small grains, and hay. Tobacco is also an important crop, but its acreage is smaller than the acreages of the other crops. Vegetables, chiefly for home use, are grown on some of the narrow strips along drainageways. Corn is grown continuously on many areas, and the acreage of corn grown for silage appears to be increasing. Red clover, lespedeza, orchardgrass, and timothy are important hay crops. Very little alfalfa is grown.

Suitability and management.—These soils are suited to many kinds of crops and to the common pasture plants. Because of their high value as cropland, they are not commonly used for pasture, although their high moisture-supplying capacity makes them especially valuable for supplemental summer pasture. All the common crops can be grown, although there is some risk in growing tobacco on the areas that are occasionally flooded. Alfalfa can be grown successfully, but alfalfa stands on the red soils of the uplands have a longer life.

These soils can be used intensively. They have no significant limitation. Row crops can be grown continuously, but it may be desirable on some farms to grow them in short rotations. Turning under crop residues and green-manure crops will help to supply organic matter and to maintain tilth and structure if row crops are grown continuously.

Even without fertilizer these soils give high yields, but fertilizer is needed to maintain high yields under intensive use. The response to fertilization is excellent. The bottom lands are generally well supplied with lime, as indicated by the slightly acid reaction. The areas along the drainageways are medium acid and require some lime for high yields of legume crops.

Special managment practices are not generally required to maintain good tilth or to control water. The soils can be tilled safely throughout a wide range of moisture content. Erosion is little or no hazard, except in a few places where streambanks are scoured or sandy material is deposited. In some places, diversion ditches are needed for protection against runoff and overwash from adjacent upland slopes.

Capability unit IIe–1

All of the soils in capability unit IIe–1 are gently sloping. They developed in sediments on low stream terraces and colluvial slopes. They are deep, moderately permeable, and well drained. Their surface soil ranges from silt loam to fine sandy loam in texture and is 4 to 8 inches thick. The subsoil ranges from silty clay loam to clay loam and is friable throughout. The slopes range from 2 to 5 percent.

The soils in this unit are—

Alcoa loam, gently sloping phase.
Etowah silt loam, gently sloping phase.
Hermitage silt loam, gently sloping phase.
Minvale silt loam, gently sloping phase.
Sequatchie fine sandy loam, gently sloping phase.
Sequatchie loam, gently sloping phase.

These soils range from moderately low to high in fertility. They are medium acid to strongly acid. Their moisture-supplying capacity is high. Because most of them are in concave positions or are lower than surrounding soils, runoff helps to increase and maintain their moisture content. They are easy to work and easy to keep in good tilth. Control of water and erosion is only a slight to moderate problem.

These soils are used for all of the common crops and for pasture. They are especially well suited to tobacco. Corn, small grains, and hay are the most extensive crops. Very little of the acreage is in forest.

Suitability and management.—These soils are suitable for moderately intensive use. They are well suited to all the crops commonly grown in the county, including tobacco and vegetables, and will produce high yields if they are well fertilized and otherwise well managed. They can also produce excellent pasture. Although not so well suited as the soils in unit I–1, they are well suited to supplemental summer pasture.

Lime and all of the fertilizer elements are required for high yields. Because of their favorable physical properties and high moisture-supplying capacity, all of these soils respond well enough to justify heavy rates of fertilization for most crops.

If these soils are well managed, controlling water is not difficult and the risk of erosion is slight.

Cultivating on the contour and leaving natural waterways in sod will help prevent erosion and increase the amount of water that enters the soil. Runoff from adjacent slopes can be controlled by diversions. The soils can be conserved if 2-year cropping sequences are used and grasses and legumes are grown half of the time. Leaving the close-growing crops for more than one year, however, may be desirable on some farms. Any of the common row crops can be used.

Capability unit IIe–2

Capability unit IIe–2 consists of gently sloping soils on uplands and high stream terraces, mainly on the smooth tops of low hills. Most of them have a surface soil that is 5 to 7 inches thick. The subsoil is red to dark red, firm clay, except that of the Waynesboro soil, which is clay loam to sandy clay. The slopes range from 2 to 5 percent.

The soils in this unit are—

Cumberland silty clay loam, eroded gently sloping phase.
Decatur silty clay loam, eroded gently sloping phase.
Dewey silty clay loam, eroded gently sloping phase.
Farragut silty clay loam, eroded gently sloping phase.
Fullerton silt loam, gently sloping phase.
Waynesboro loam, eroded gently sloping phase.

All of these soils are well drained and deep. The depth to the bedrock is normally more than 3 feet and ranges up to 30 to 40 feet.

The natural fertility ranges from low to high. The reaction is medium acid to very strongly acid. The capacity to supply moisture is about medium. Large quantities of water are absorbed and held, but much of the water is held tightly by the clay particles and is unavailable to plants.

Almost all of the acreage has been cultivated. Some is used for pasture, mainly rotation pasture. Very little is idle. Corn, small grains, and legume-and-grass hay are extensively grown. Tobacco is the most important cash crop, even though the total acreage of it is small. Only a few, small, scattered patches remain under forest.

The moderately high natural fertility of most of these soils tends to offset the medium moisture-supplying capacity. Yields are, therefore, fairly high. The fertility has been fairly well maintained, and in some cases increased, by the use of commercial fertilizers.

Suitability and management.—These soils are suited to all the commonly grown crops and pasture plants. They are among the best soils of the county for alfalfa, other legumes, and grasses that are grown for hay or pasture. They are probably relatively better suited to them than to row crops, although good yields of row crops can be obtained. They are well suited to winter pasture because of their productivity, high position, and good drainage. They are moderately well suited to supplemental summer pasture.

If all necessary precautions are observed, the soils of this unit can be used intensively. They need a protective cover in winter when rainfall is high. They cannot be cultivated throughout so wide a range of moisture content as can the more friable soils in units IIe–1 and I–1. Because they contain much clay, they puddle or clod if they are cultivated when too wet. When these soils are dry, the eroded parts where the clayey subsoil is near the surface are especially difficult to cultivate.

Because runoff develops more quickly than on the soils in unit IIe–1, control of water is more difficult. Terracing is effective in controlling runoff on the longer slopes. Management requirements include cultivating on the contour and leaving natural waterways in sod. A 2-year or, preferably, a 3-year rotation, in which close-growing crops are used at least half of the time, will conserve these soils. A suitable rotation is corn, small grain, and then 1 or 2 years of grass and clover or alfalfa.

Fertilizers and lime are required to maintain high yields of all crops. If legumes are grown, they supply a part of the needed nitrogen. Good tilth is not particularly difficult to maintain, but these soils need more care in seedbed preparation and other cultivation practices than do more friable soils.

Capability unit IIe–3

Capability unit IIe–3 consists of one well-drained, moderately deep soil that occurs mostly on the smooth tops of low hills and is underlain at depths of 2 to 4 feet by soft shale bedrock. The slopes range from 2 to 5 percent. The surface soil is 4 to 7 inches thick. It is dominantly silty clay loam, but where least eroded it is almost like silt loam. The subsoil is yellowish-red, firm silty clay.

The only soil in this unit is—

Sequoia silty clay loam, eroded gently sloping phase.

This soil is moderately low to low in fertility. It is strongly acid. Because it has a very clayey subsoil, its moisture-supplying capacity is about medium, and permeability is moderately slow. It is fairly easy to work and to conserve.

Nearly all of the acreage is cultivated. A few small tracts of farm woodland are in native hardwood and pine. The common crops are corn, small grains (mainly oats and wheat), hay, and pasture. Lespedeza is the most common plant for both hay and pasture. Much of the pasture is unimproved.

Suitability and management.—This soil is suited to all of the common crops. If well fertilized and otherwise well managed, it will produce good yields of crops and pasture.

This soil should not be used for row crops more often than once in 2 or 3 years. Any of the common crops can be grown. A good cropping sequence consists of a row crop followed by 1 or 2 years of a grass-legume mixture. Terracing is effective in controlling runoff on the longer slopes. Turning under crop residues and green-manure crops will add organic matter and thereby increase the moisture-supplying capacity and improve tilth.

Crop yields are lower than on the soils of units I–1 and IIe–1. The response to fertilization is only moderate. Because of the limited moisture supply, large amounts of fertilizer would probably not be efficiently used.

Even though the slopes are mild, control of water and erosion is a moderate problem. Because of the shallowness and moderately slow permeability of the soils, considerable water runs off during rainy weather. Cultivating on the contour will allow more water to be absorbed and reduce runoff.

Most of this soil, particularly the spots where the surface soil is thin, can be tilled within only a narrow range of moisture content. It puddles or clods if cultivated when wet and becomes rather hard when dry.

Capability unit IIe-4

The soils in capability unit IIe–4 are friable and permeable in the upper 1½ to 2 feet, but below this depth they are slowly permeable. Bedrock is at depths of 3 to 5 feet or more. All of these soils are on foot slopes or on second bottoms. Their surface soil is yellowish-brown to brown, friable silt loam. The subsoil, to a depth of about 20 to 24 inches, is yellowish-brown, friable silty clay loam. The material below this depth is mottled and compacted. The slopes range from 1 to 12 percent but are predominantly from 2 to 5 percent.

The soils in this unit are—

Landisburg silt loam, gently sloping phase.
Landisburg silt loam, eroded sloping phase.
Landisburg cherty silt loam, gently sloping phase.
Leadvale silt loam, gently sloping phase.
Wolftever silt loam.

These soils are moderately low to moderate in fertility. They contain little organic matter. They are medium acid to very strongly acid. Their moisture-supplying capacity is medium; it is favorably affected by their concave position. Tilth is good except in the small acreage that is cherty. These soils can be tilled throughout a fairly wide range of moisture content. Runoff is difficult to control only where it comes directly onto these areas from steeper slopes.

Much of the acreage is used for corn, small grains, hay, and pasture. Some is idle. Tobacco is the most important cash crop. Lespedeza is the most common hay crop. Fertilization of these soils has been light, and the yields are low.

Suitability and management.—These soils are suited to fairly intensive use. They will produce good yields of all the common crops except alfalfa. The drainage is not good enough for profitable yields of alfalfa. The soils can be maintained in a 2- to 3-year rotation of corn, a small grain, and lespedeza or red clover.

These soils require heavy fertilization for good yields of all crops. This is particularly true of the Leadvale and Landisburg soils. Moderate to heavy applications of complete fertilizers and lime are essential for good yields of both crops and pasture plants. Response is good.

Supporting practices to conserve the soils are easy to apply: keeping natural waterways in sod, cultivating on the contour, and using diversion ditches for protection against runoff from the adjacent upland slopes.

Capability unit IIw-1

The soils in capability unit IIw–1 are deep over bedrock but are moderately well drained to somewhat poorly drained. They occur on first bottoms or as narrow strips along lateral drainageways. They are level or nearly level; some areas are slightly depressed. The slopes range from 0 to 2 percent.

The soils in this unit are—

Lindside silt loam.
Lindside silt loam, local alluvium phase.
Lobelville cherty silt loam.

The lack of good drainage is caused by a periodically high water table or by excess seepage water from nearby slopes of the uplands. A large part of the acreage is likely to be flooded at times, but flooding generally lasts for only a few hours. The local alluvium phase of the Lindside soils is not ordinarily subject to flooding, but it is likely to be washed by runoff from the adjacent slopes. Both floods and runoff are hazards to crops, but they replenish the supply of plant nutrients by adding fresh sediments.

On the bottom lands, the water table is near the surface during periods of high rainfall. The uppermost 15 to 18 inches is friable and well aerated, but below this the material is mottled and not well aerated. These soils have a very high moisture-supplying capacity, and consequently are productive of crops that grow in the summer months.

Almost all of the acreage is used for crops, mainly corn and hay. Lespedeza is the most extensive hay crop, but red clover, timothy, and orchardgrass are also grown for hay. Many areas are used continuously for row crops, mostly corn. Soybeans are grown in a few places. Very little of the acreage has been artificially drained, but in a few places stream channels have been straightened in order to remove runoff more rapidly. Although the total acreage is small, the soils of this unit are very important because they are moderately fertile and easy to cultivate and to conserve.

Suitability and management.—Retarded internal drainage limits the use of these soils. They are generally not suited to alfalfa. Tobacco may grow well in a dry year, but the risk of failure of such a high-value crop is too great to take. Small grains generally grow well, but they commonly tend to lodge and to mature later than they do on better drained soils of the uplands.

These soils are especially well suited to pasture and are particularly valuable for supplemental summer pasture. Good stands of grasses and legumes and of nearly all the common pasture plants can be grown. Plants continue to grow during dry periods when plants on the uplands have ceased to grow.

Row crops can be grown almost continuously, but they grow best in short rotations. A rotation of corn and hay is especially well suited. If row crops are grown intensively, organic matter can be supplied and tilth maintained by turning under winter legumes in the spring.

Good yields of corn, soybeans, sorghum, small grains, red clover, white clover, orchardgrass, timothy, and lespedeza can be obtained. Although fairly good yields are obtained without the use of amendments, fertilizer is needed to maintain high yields under intensive use. The response to fertilization is good. As a group, the soils in this unit are fairly well supplied with lime, but small amounts may be needed on some areas, particularly on the Lobelville soil. Soil tests should be made before lime is applied.

These soils do not need special tillage. They can be tilled throughout a fairly wide range of moisture content. Field operations, however, are often delayed in the spring because of excessive moisture. In some places, ditches are useful for diverting overwash and runoff.

The range of suitability and productivity of these soils can be increased in many places by artificial drainage.

The advisability of drainage, however, depends on the costs, the feasibility from an engineering standpoint, the acreage of suitable soils on the farm, and many other factors. Because it would make these soils suitable for only a few additional crops, artificial drainage probably is not advisable on some farms.

Capability unit IIIe–1

The soils in capability unit IIIe–1 are deep and well drained. They occur on 5 to 12 percent slopes on low stream terraces or old colluvium. The surface soil is brown to dark-brown loam or silt loam. The subsoil is yellowish-brown to yellowish-red silty clay loam or clay loam.

The soils in this unit are—

Alcoa loam, sloping phase.
Etowah silt loam, eroded sloping phase.
Hermitage silt loam, eroded sloping phase.
Hermitage cherty silt loam, sloping phase.
Minvale silt loam, eroded sloping phase.
Minvale cherty silt loam, eroded sloping phase.
Sequatchie loam, sloping phase.

These soils are friable and permeable throughout. They absorb water readily and have a high moisture-supplying capacity. The fertility ranges from moderate to high, and the reaction is generally medium acid to strongly acid. These soils have good tilth, are easy to work, and are fairly easy to conserve. A very small acreage has some fine chert fragments but not enough to prevent normal cultivation. The cherty areas do not have so high a moisture-supplying capacity and are not so productive as the chert-free soils.

These soils are farmed rather intensively. Nearly all the acreage is cultivated. Only a few, scattered, small patches are in native hardwood forest. Very little is idle. Many small areas are used for garden crops. All of the common crops are grown, mainly corn, hay, small grains, and pasture. Lespedeza, alfalfa, timothy, and red clover are the common hay crops. Much of the acreage is used for crops grown in short rotations, but tobacco is grown on the same plots year after year. Tobacco is an important crop, but the total acreage of it is small.

Suitability and management.—These soils can be used for a wide range of crops and pasture plants. They are well suited to crimson clover, oats, and other plants grown for winter pasture. Pastures on these soils can be grazed for longer periods than can those on the finer textured clayey soils.

Because they are sloping, these soils are somewhat more susceptible to erosion than the soils in unit IIe–1, and they need longer rotations that include more close-growing crops. A rotation consisting of corn or other row crop, a small grain, and 2 years of mixed legumes and grasses grown for hay or pasture is well suited. Any of the common row crops, small grains, grasses, and legumes can be used in this rotation.

The fairly high natural fertility of these soils is not difficult to maintain. The response to nitrogen, phosphate, potash, and lime is excellent. Yields of all crops are good. Liberal applications of complete fertilizers and lime are generally needed to establish pasture of high quality.

These soils can be cultivated throughout a fairly wide range of moisture content. Because of the slope and the moderate risk of erosion, water should be controlled by cultivating on the contour and leaving the natural drainageways in sod. Stripcropping may be needed on some of the longer slopes, but in most places water can be controlled by keeping the soil in close-growing plants much of the time. Diversion ditches are needed in many areas for protection against runoff and overwash from the adjacent upland slopes.

Capability unit IIIe–2

Capability unit IIIe–2 is made up of deep, well-drained soils that developed in noncherty and sandy limestone residuum or in old alluvium. The bedrock normally is limestone, and the soil depth is more than 3 feet. The surface soil is brown to dark reddish-brown loam, silt loam, or silty clay loam, about 4 to 8 inches thick. The subsoil is chiefly clay but ranges in texture to sandy clay; in color it ranges from yellowish red to dark red. The slopes range from 5 to 12 percent.

The soils in this unit are—

Bolton silt loam, eroded sloping phase.
Cumberland silty clay loam, eroded sloping phase.
Cumberland gravelly clay loam, eroded sloping phase.
Decatur silty clay loam, eroded sloping phase.
Dewey silty clay loam, eroded sloping phase.
Farragut silty clay loam, eroded sloping phase.
Fullerton silt loam, sloping phase.
Tellico loam, eroded sloping phase.
Waynesboro loam, sloping phase.
Waynesboro loam, eroded sloping phase.

These soils are medium acid to strongly acid. Their natural fertility is low to moderately high. They absorb large quantities of water, but, because the subsoil contains so much clay, the moisture-supplying capacity is medium.

Except for the gravelly Cumberland soil, these soils are fairly easy to work, and good tilth is not difficult to maintain. However, the soils with a silty clay loam surface soil cannot be tilled throughout a very wide range of moisture content without injury to their structure and tilth.

Nearly all of the acreage has been cropped. About 5 percent remains in native hardwood forest. Many kinds of crops and pasture plants are grown. Corn, hay, and small grains are extensively grown. Alfalfa is an important hay crop, but lespedeza, timothy, orchardgrass, and red clover are also grown. Tobacco is an important cash crop.

About 30 to 35 percent of the acreage is in pasture, some of it rotation pasture. Some of the best pastures in the county are on the soils of this unit.

Suitability and management.—These soils are well suited to all crops commonly grown in the county. They are particularly well suited to small grains, hay, and pasture. Some are very good for alfalfa. Tobacco and vegetables can be grown but are not so well suited to these soils as to the more friable soils in unit IIIe–1.

Because of the slopes and the risk of erosion, row crops should not be grown more than 1 year out of every 3 or 4 years. Because the permeability of the subsoil is slower than that of the soils in unit IIIe–1, runoff is a greater hazard, and more exacting management is needed. A suitable rotation is corn, a small grain, and then grasses

and legumes grown for hay or pasture for 2 or 3 years. On some farms, a small grain and grass-and-legume rotation might be more suitable.

These soils respond well to fertilization and management but less well than the soils in unit IIIe–1. The fertility is generally moderately high, but additions of all fertilizers are required for maximum yields. Although well suited to row crops, these soils may yield higher returns if used for close-growing crops. Because of the medium moisture-supplying capacity the potential yields of row crops are about moderate. Yields of close-growing crops are relatively high because they grow mainly during the seasons of favorable moisture.

Because these soils contain so much clay, they cannot be tilled throughout so wide a range of moisture content as can the soils in unit IIIe–1. They clod or puddle if they are cultivated when they are wet, and they become rather hard when dry. Crop residues and green-manure crops turned under will improve tilth. If row crops are grown, runoff can be controlled by cultivating on the contour and leaving natural waterways in sod. Stripcropping may be needed on some of the longer slopes.

Capability unit IIIe–3

The soils in capability unit IIIe–3 have moderate to large amounts of fine chert fragments or rounded pebbles on the surface and throughout the profile. These soils developed in residuum from cherty limestone and in old, coarse-textured alluvium. They are on the rounded tops of hills. The slopes range from 5 to 12 percent. These soils are deep, well drained, and highly leached in the upper part.

The soils in this unit are—

Clarksville cherty silt loam, sloping phase.
Fullerton cherty silt loam, sloping phase.
Nolichucky gravelly fine sandy loam, sloping phase.
Waynesboro gravelly loam, eroded sloping phase.

The surface soil is dominantly yellowish-brown, cherty or gravelly silt loam to fine sandy loam and is from 5 to 8 inches thick. The subsoil is yellowish-red to red, cherty or gravelly clay loam to cherty or gravelly silty clay loam. The Waynesboro soil is slightly less leached and is darker colored than the other soils in this unit.

These soils are low in fertility and are strongly to very strongly acid. They have very little organic matter. They are very friable and moderately permeable, but they contain so much chert or gravel that the moisture-supplying capacity is medium to low and cultivation is difficult. Because these soils absorb water at a rapid rate, they are less erosive than the soils in unit IIIe–2. They can be tilled throughout a wide range of moisture content, and they are not likely to clod or puddle.

Nearly half of the acreage is in hardwood forest. The rest is used for many kinds of crops and pasture. A large acreage is used for native or unimproved pasture that consists mainly of lespedeza and some volunteer plants. Corn, small grains, and hay are common crops.

Suitability and management.—These soils are suited to most common crops. However, tobacco and other high-value crops grow better on lower lying soils that have better moisture-supplying capacity, such as those in unit IIIe–1. Late-maturing row crops do not grow well because of lack of moisture in the latter part of the growing season.

These soils are less erosive than the chert-free and gravel-free soils that contain more clay. However, they will erode if cultivated, and they are not suited to intensive use. If they are used for tilled crops, the cropping sequence should be long and should consist of close-growing and sod crops about 3 years out of 4. A suitable cropping sequence consists of a row crop, a small grain, and then 2 or 3 years of grass-and-legume hay or pasture. In some areas, a rotation of a small grain and a grass-and-legume mixture may be more profitable, since these soils are not very good for row crops.

Most of the common crops do not give consistently high yields. They respond to all of the fertilizer elements and to lime, but the response is not good enough to produce very high yields or to justify extremely heavy fertilization. Adequate fertilization and liming are a necessity for even moderate yields of all crops. Small grains and most hay and pasture plants will give moderate yields if well fertilized. But alfalfa does not yield so well or last so long as on more suitable soils.

These soils do not require many special practices for controlling erosion. Cultivating on the contour is the main practice to be followed. Stripcropping may be needed on the few long slopes.

Capability unit IIIe–4

The soils in capability unit IIIe–4 are well drained. They occur chiefly on the rounded tops of rolling hills. Generally, they are about 2½ feet deep over shale or limestone bedrock; however, the range in depth is from 1½ to 4 feet. The surface soil is yellowish-brown or brown silty clay loam to silt loam that is 4 to 8 inches thick. The subsoil is yellowish-red, very firm clay to silty clay. The slopes range from about 5 to 12 percent.

The soils in this unit are—

Sequoia silt loam, sloping phase.
Sequoia silty clay loam, eroded sloping phase.
Talbott silty clay loam, eroded sloping phase.

The natural fertility of these soils is moderately low, and the reaction is strongly acid. There is little organic matter in any of them. Plant roots can penetrate the subsoil, but permeability is moderately slow. Because the subsoil contains so much clay, these soils have a medium to low moisture-supplying capacity. The Talbott soil has outcrops of limestone bedrock in some places and is more droughty than the Sequoia soils.

These soils erode easily if cultivated. Control of water requires special attention. Where erosion losses have been slight and the remaining surface soil is silt loam, the tilth is fairly good and not difficult to maintain. However, the more eroded areas, which have much clay in the surface soil, have poorer tilth. The range of moisture content within which they can be tilled without clodding or puddling is narrow.

Nearly all of the acreage has been cultivated. Probably 5 to 10 percent remains in small scattered patches of hardwood forest. About 35 percent of the acreage is used as pasture, and a significant acreage is idle. Part of the pasture has been improved by seeding and fertilizing. Corn, hay, and small grains are the most extensive crops. A small acreage is in tobacco, truck crops, and alfalfa.

Suitability and management.—These soils are not well suited to truck crops, especially root crops. They are better suited to early-maturing crops than to those that mature late in summer or early in fall. They are suited to small grains and nearly all hay and pasture plants. If they are well fertilized and otherwise well managed, they produce good yields of alfalfa. The more eroded areas are not well suited to tobacco. Corn is grown, but yields are rather low.

Row crops should be grown only infrequently. Most cultivated areas need a 4-year cropping system in which close-growing crops or sod are grown 3 years out of 4. A suitable rotation consists of a row crop, a small grain, and then 2 or 3 years of grass-and-legume hay or pasture. A rotation of a small grain and a grass-and-legume mixture may be more profitable than one that includes a row crop.

Except where tobacco and vegetables have been grown, fertilization has been light. If the soils are well fertilized, they produce good permanent pasture of legumes and grasses, but the plants make little growth during the dry seasons. Substantial amounts of complete fertilizers and lime must be applied if satisfactory yields are to be obtained. Because of the low moisture-supplying capacity, response to fertilization is not so good as on the more friable, permeable soils.

These soils can be tilled only within a narrow range of moisture content. Tilth is difficult to maintain because the plow layer is clayey, especially in the more eroded areas. The plow layer tends to clod or puddle if cultivated when too wet and tends to be very hard when dry.

Because of the rapid runoff and the erosion hazard, these soils need protection. It is particularly important to keep the remaining surface soil, because the subsoil is poor. Cultivating on the contour and keeping vegetation in all natural waterways will help. Stripcropping is needed on some of the longer slopes. Terracing may not be practical because of the moderate depth to bedrock and the bedrock outcrops in the Talbott soil.

Capability unit IIIw–1

The one soil in capability unit IIIw–1 occurs on first bottoms and is poorly drained. It is nearly level to slightly depressed, and runoff and internal drainage are slow. The surface soil is grayish-brown silt loam about 7 or 8 inches thick. It overlies a gray, or gleyed, layer that ranges from silt loam to silty clay loam in texture. The slopes range from 0 to 2 percent.

The only soil in this unit is—

Melvin silt loam.

This soil is moderately high in natural fertility. It is slightly acid to neutral. It is too wet to be tilled during much of the year. Most areas are likely to be flooded at times, but flooding normally lasts for only a few hours. The fluctuating water table is near or at the surface during periods of high rainfall. Along the rims of flood plains much seepage water flows onto this soil from the adjacent upland slopes.

Almost all of the acreage has been cleared. Much of it is now used for pasture; a small part is used for corn and hay crops. A few areas are in high-yielding pasture of whiteclover and fescue. Only a very few areas have been artificially drained.

Suitability and management.—Unless artificially drained, this soil is poorly suited to many crops. It is best suited to fescue, white clover, ladino clover, and alsike clover. It produces good yields of corn in some seasons, but the risk of failure is high. Soybeans yield well, but they, too, may fail because of flooding.

The main need of this soil is improved drainage. Applying fertilizer and growing water-tolerant plants can improve the pasture to some extent, but the grazing would be limited to rather short periods in summer, when the water table is low. If this soil is adequately drained and fertilized and seeded to suitable grasses and legumes, it produces pasture of high carrying capacity. Artificial drainage would also broaden the suitability to include corn, soybeans, and other row crops, and red clover, timothy, and other hay crops.

The practicability of artificial drainage depends on several factors, including (1) the availability of adequate outlets for drainage water; (2) the cost of installing the drainage system compared to the value of increased production; and (3) the need for additional cultivated acreage.

Capability unit IIIs–1

The soils in capability unit IIIs–1 are shallow and well drained to excessively drained. They occur mostly on the tops of low hills, and their slopes range from about 5 to 12 percent. The depth to the shale or limestone bedrock is uneven and ranges from a few inches to 20 inches. Outcrops of shale or limestone are common.

The soils in this unit are—

Bland silty clay loam, sloping phase.
Colbert silty clay loam, sloping phase.
Litz silt loam, sloping phase.

The bedrock under the Litz soil is soft, shaly, and easily broken, but that under the Colbert and Bland soils is massive and hard.

The natural fertility ranges from moderate to low. The Bland soil is slightly acid, the Colbert soil is medium acid, and the Litz soil is strongly acid. All are low in organic matter. The Bland and Colbert soils are fine textured and moderately slow to slow in permeability. The Litz soil is medium textured, but it is so shallow that deep root systems cannot develop. Because of shallowness, moderately steep slopes, and slow permeability in some of these soils, the moisture-supplying capacity is very low. Runoff is rapid, and good management is needed to control erosion.

About 80 percent of the acreage has been cleared and cultivated. A large part of the cleared acreage is used for unimproved pasture. A significant acreage is idle. The chief crops are corn, small grains, and hay, mainly lespedeza.

Suitability and management.—Because they are sloping, shallow, and droughty, these soils are not well suited to row crops. It is doubtful if row crops can be profitably grown on any of them. They are better suited to pasture and hay plants—fescue, ryegrass, and sericea lespedeza. The Litz soil will produce fair yields of orchardgrass, red clover, and alfalfa, but the other soils of this unit will not.

If crops are grown on these soils, long rotations, consisting of close-growing crops and sod about 4 years out of

5, are needed. A small grain, followed by about 4 years of grass-and-legume hay or pasture, is suitable. Yields of small grains, which grow early in the season while there is plenty of moisture, are fair to good. Fescue, sericea lespedeza, ryegrass, and other pasture and hay plants also utilize the moisture to good advantage since they, too, make much of their growth in spring and early in summer when moisture is adequate.

A moderate rate of fertilization is advisable, since the moisture-supplying capacity is so low that large amounts of fertilizer cannot be used effectively. Response to all of the fertilizer elements, especially nitrogen and phosphate, is fair. The Litz soil requires more lime than do the Colbert and Bland soils.

The Colbert and Bland soils generally have poor tilth, and the common outcrops of rock make cultivation difficult. Some areas of the Litz soil, especially the more severely eroded spots, are difficult to cultivate because the plow layer contains much shale and the soil is shallow over the shale bedrock. In many places where the shale is near the surface, it is practical to break the shale by deep tillage. This operation increases the depth of permeable material.

Because the loss of even a small amount of soil material is important on these shallow soils, the rapid runoff must be controlled. Keeping the soils in close-growing vegetation is probably the most effective way to reduce soil losses through erosion. If row crops are grown, the water must be controlled by suitable practices. Cultivating on the contour and keeping the natural drainageways in sod will help. Long slopes should be stripcropped.

Capability unit IVe–1

The soils in capability unit IVe–1 are deep to bedrock. They are well drained and have fine-textured subsoils. They are on short, moderately steep slopes. The slopes range from 12 to 20 percent. The surface soil ranges in texture from fine loam and silt loam to silty clay loam. It is from 4 to 7 inches thick. The subsoil is chiefly firm, plastic clay to sandy clay and is yellowish red to dark red.

The soils in this unit are—

Bolton silt loam, eroded moderately steep phase.
Cumberland silty clay loam, eroded moderately steep phase.
Cumberland gravelly clay loam, eroded moderately steep phase.
Decatur silty clay loam, eroded moderately steep phase.
Dewey silty clay loam, eroded moderately steep phase.
Etowah silt loam, eroded moderately steep phase.
Farragut silty clay loam, eroded moderately steep phase.
Fullerton silt loam, moderately steep phase.
Tellico loam, eroded moderately steep phase.
Waynesboro loam, eroded moderately steep phase.

All except the Fullerton soil have moderate to moderately high fertility. The Fullerton soil has low fertility. All are medium to strongly acid. Because of their depth and large volume of internal pore space, these soils absorb large quantities of water. Much of the water, however, is held tightly by the clay particles and is not available to plants. These soils, therefore, have only medium moisture-supplying capacity. Their thin surface soil is very permeable, but the dominantly clayey subsoil is moderately permeable. The Bolton, Etowah, Tellico, and Waynesboro soils have subsoils that are more friable and less clayey than the other members of this unit. Surface runoff is rapid, and the soils are highly susceptible to sheet erosion.

About 85 to 90 percent of the acreage of these soils has been cultivated. All of the common crops are grown to some extent, and a large acreage is used for hay and pasture crops. Corn occupies a significant acreage, and small grains are extensively grown. Alfalfa is an important hay crop.

Suitability and management.—These soils are suited to all of the common crops, including alfalfa, red clover, and other deep-rooted legumes. They are probably the best soils in the county for alfalfa. Because of their strong slopes, they are best suited to hay and pasture plants. If adequately fertilized and limed, they produce pasture of high quality.

Row crops are grown successfully, but they should not be grown more than once in 5 or 6 years. A rotation consisting of a row crop, a small grain, and then legume-and-grass hay or pasture for about 5 years is well suited. A rotation consisting entirely of close-growing crops is beneficial in stabilizing the soil and in using the available water effectively. Any of the common row crops or hay and pasture plants can be used in the rotation. Stripcropping is effective in controlling runoff and erosion and in making better use of water.

Because moisture supplies are normally low in the later part of the growing season, corn or other late-maturing crops are not so well suited as small grains and other early-maturing crops. Nevertheless, moderate yields of row crops can be obtained. Cultivating on the contour will help conserve water and will reduce erosion. Natural waterways should be kept in sod.

These soils respond well to fertilizers and lime.

Because most of these soils contain much clay in the surface soil, they have only fair tilth. They cannot be tilled over so wide a range of moisture content as can the sandier, more friable soils. They tend to clod or puddle if worked when wet, and they become rather hard when dry. Within the proper range of moisture content, however, the soils are rather easy to work. The gravelly Cumberland soil is difficult to work because the gravel interferes with cultivation.

Capability unit IVe–2

Capability unit IVe–2 consists of deep soils that have many chert fragments and rounded pebbles on the surface and in the soil. The bedrock is cherty dolomitic limestone in almost all places. The surface soil is light colored and ranges in texture from cherty silt loam to gravelly fine sandy loam. The subsoil is cherty or gravelly sandy clay loam to cherty or gravelly silty clay loam. The moderately short to long slopes range in gradient from 12 to 25 percent.

The soils in this unit are—

Clarksville cherty silt loam, moderately steep phase.
Fullerton cherty silt loam, moderately steep phase.
Nolichucky gravelly fine sandy loam, eroded moderately steep phase.
Waynesboro gravelly loam, eroded moderately steep phase.

Highly leached in the upper part, these soils are low in fertility and are very strongly acid. They are moderately permeable to a depth of several feet, but their moisture-supplying capacity is generally low. They can be cultivated, but they contain so much chert and gravel that they are difficult to work. They will erode if cultivated.

The chert and gravel on the surface tend to slow up the flow of surface water and to allow more water to be absorbed, but the chert and gravel in the profile limit the capacity for storing water and supplying it to plants.

About 55 percent of the acreage is in cutover forest consisting mainly of hardwoods with which a few pines are intermingled. Pasture is the dominant use of the cleared portion. Many of the pastures are unimproved. Lespedeza is the most common pasture plant. Corn, small grains, and hay are the most extensive crops.

Suitability and management.—These soils are not well suited to late-maturing row crops, because the moisture-supplying capacity is low. They are all well suited to small grains and to most of the hay and pasture plants. Yields of alfalfa are not high, and the stands do not last long. The fertilizer requirements for alfalfa are high. Fescue grows well, and orchardgrass and whiteclover can be grown under good management.

A rotation consisting of a row crop, a small grain, and then legume-and-grass hay or pasture for about 5 years is well suited to these soils.

Fertility is low; the soils are deficient in nitrogen, phosphorus, potassium, and calcium. Unless they are well fertilized, yields will be very low and many crops will fail. The response to fertilizers and lime is moderate. It is best in spring and early in summer, when there is sufficient moisture to allow full use of the fertilizers.

Cultivation is possible throughout a fairly wide range of moisture content. Because they do not contain much clay in the surface layer, the soils are not very susceptible to clodding or puddling when tilled. To maintain productivity and to reduce soil losses to a minimum, all cultivation and other farming operations should be on the contour. Waterways should be kept in sod, to help prevent gullying. Stripcropping is a good practice because most of the slopes are fairly long.

Capability unit IVe–3

The soils in capability unit IVe–3 are yellowish red to dark red. Generally they are deep to bedrock. The slopes range from 5 to 20 percent but are predominantly between 12 and 20 percent.

The soils in this unit are—

Cumberland silty clay loam, severely eroded sloping phase.
Cumberland silty clay loam, severely eroded moderately steep phase.
Decatur silty clay loam, severely eroded sloping phase.
Decatur silty clay, severely eroded moderately steep phase.
Dewey silty clay, severely eroded sloping phase.
Dewey silty clay, severely eroded moderately steep phase.
Farragut silty clay, severely eroded sloping phase.
Farragut silty clay, severely eroded moderately steep phase.
Fullerton silty clay loam, severely eroded sloping phase.
Fullerton silty clay loam, severely eroded moderately steep phase.
Sequoia silty clay, severely eroded sloping phase.
Sequoia silty clay loam, eroded moderately steep phase.
Talbott silty clay, severely eroded sloping phase.
Talbott silty clay, severely eroded moderately steep phase.
Tellico clay loam, severely eroded sloping phase.
Tellico clay loam, severely eroded moderately steep phase.
Waynesboro clay loam, severely eroded moderately steep phase.

The plow layer is firm silty clay to silty clay loam. The surface soil is thin, and the clayey layer is near the surface. The Talbott and Sequoia soils are shallower than the others in this unit.

These soils are somewhat slowly permeable, but they have good internal drainage. They contain very little organic matter and are medium acid to strongly acid. Their fertility has been very much lowered by accelerated erosion. Water is absorbed rather slowly, and runoff is high. The moisture-supplying capacity is low, and plants are injured during dry periods. Tilth is generally poor. The soils are difficult to work and to conserve.

Suitability and management.—These soils are rather poorly suited to cultivated crops, but under careful management most of the common plants can be grown. If it is necessary to grow row crops, the rotation should be at least 5 or 6 years long. A suitable rotation consists of a row crop, a small grain, then legume-and-grass hay or pasture for about 5 years. Because the soils are clayey and have low water-supplying capacity, they are not suited to tobacco and vegetables. They are better suited to small grains than to corn because small grains mature early, while moisture conditions are still favorable. However, corn grows fairly well in a long rotation.

Good pasture can be established if enough fertilizer and lime are used and grazing is controlled. Because the soils are clayey, they should be well pulverized before pasture plants are planted.

All of the common trees will grow, although they grow less rapidly than on more friable soils. The north-facing slopes are more productive of trees than the south-facing slopes, which are drier.

These soils are low to moderate in plant nutrients. Because of poor moisture conditions, their response to fertilizers is only moderate, especially during periods of low rainfall. Turning under green-manure crops, crop residues, and barnyard manure will improve tilth, moisture conditions, and fertility.

Even if kept in pasture or close-growing crops, these soils need particular care to protect them from runoff and erosion. All farming operations should be on the contour. Natural waterways should be kept in heavy sod. Areas used for crops should be stripcropped on the contour.

Capability unit IVw–1

Capability unit IVw–1 consists of light-colored soils developed from old alluvium that was derived chiefly from limestone.

The soils in this unit are—

Robertsville silt loam.
Taft silt loam.

These soils range from nearly level to slightly depressed; the slope is generally less than 2 percent. The surface soil is highly leached, friable silt loam about 8 inches thick. The subsoil is dense, compacted silty clay loam to clay. In places the subsoil is highly mottled, and in other places it is uniformly gray. The Taft soil is somewhat poorly drained, and the Robertsville soil is poorly drained.

The strong mottling and the gray color indicate that the subsoil is saturated with water during parts of the year. The surface soil is friable and has slow to very slow permeability; the dense subsoil has slow permeability. Root systems cannot develop extensively or rapidly. The moisture supply is erratic. The soils are very wet

during rainy weather and extremely dry during dry weather. The subsoil has little pore space and very limited capacity to absorb and hold water. Rainfall and water that flows from upland slopes drain away very slowly, and the surface is extremely wet in winter and spring. These soils are very low to low in fertility, are very strongly acid, and contain very little organic matter.

Practically all of the acreage is cleared. A small part is used for hay, corn, and small grains. Native pasture is the main use. Lespedeza is the most important crop, both for hay and for pasture.

Suitability and management.—Under natural drainage, these soils are poorly suited to many of the common crops, including alfalfa, tobacco, and vegetables. Crops that can tolerate excessive wetness are best suited. These are soybeans, grain sorghum, white clover, alsike clover, fescue, and redtop. Yields of corn and small grains are medium on the Taft soil and low on the Robertsville soil. Lespedeza can be overseeded on pastures and will produce fair yields of either hay or pasture.

Substantial fertilization is required for good yields of all plants. If the soils are not drained, water-tolerant plants respond moderately well to adequate fertilization. Because the moisture supply is erratic, the response is not consistently high. Plants make little growth during the drier periods.

If these soils could be artificially drained, most of the common crops could be grown. The soils could be used intensively for crops because they are nearly level and the erosion hazard is slight. However, artificial drainage is not feasible for some areas because of lack of water outlets. Also, the cost is higher than the cost of draining bottom lands because of the slow lateral movement of water and the need for close spacing of the drains. The need for additional cultivated land on a farm will determine whether the cost is justifiable.

Capability unit IVs–1

The soils in capability unit IVs–1 are well drained and light colored. They are shallow over the shale or limestone bedrock. In some places the 5- to 6-inch surface layer is almost free of shale fragments, but the rest of the acreage is shaly throughout the profile. Shale outcrops are common in severely eroded places. The slopes are predominantly between 12 and 20 percent.

The soils in this unit are—

Bland silty clay loam, moderately steep phase.
Lehew loam, moderately steep phase.
Litz shaly silty clay loam, sloping phase.
Litz silt loam, moderately steep phase.
Litz shaly silty clay loam, moderately steep phase.
Sequoia silty clay, severely eroded moderately steep phase.
Steekee loam, moderately steep phase.

These soils are low to moderate in fertility. They contain a small amount of organic matter. The Bland soil is slightly acid, and the other soils are medium acid to very strongly acid. Because they are shallow, all of these soils have low to very low moisture-supplying capacity and are droughty. Runoff develops quickly during rains, and the control of water is a problem.

Part of the acreage is in cutover, native, deciduous forest. Some of the cleared acreage is used for hay, small grains, and corn, but a large acreage is used for unimproved pasture. A significant acreage is idle. Lespedeza is the most widely used plant, both for hay and for pasture.

Suitability and management.—Because these soils are droughty and shallow, they are not productive of row crops. They are probably best suited to small grains, which grow when the moisture is more plentiful. Areas of Litz soils that are little eroded produce fair to medium yields of alfalfa. Pasture of fair to medium quality and quantity can be established and maintained if plants that have low fertility and moisture requirements are seeded. Because the moisture-supplying capacity is low, the periods during which pasture vegetation grows and is palatable are limited.

All of these soils erode rapidly and easily if cultivated. Row crops should be grown only in very long crop rotations that allow the soils to be in sod for about 5 years out of 6. Even in long rotations, small grains are better suited than row crops. A rotation consisting of a grain followed by 5 years of fescue and whiteclover for pasture is suitable. Overseeding lespedeza on pasture is inexpensive and usually profitable. The lespedeza can be used for either pasture or hay.

The response to fertilizers is medium. All the soils except the Bland soil need moderate applications of lime. Moderate amounts of nitrogen, phosphorus, and potassium are needed by all. Large amounts cannot be utilized, because the moisture supply is so small. Fair to medium yields of some of the close-growing crops and pasture plants can be obtained. Yields of corn, tobacco, and vegetable crops are generally too low to be profitable.

These soils are highly erodible, and it is very important that they be protected from further losses. Farming on the contour and sodding natural waterways will help. On the shaly soils deep tillage, or subsoiling, is beneficial because it increases the depth of permeable material and, consequently, allows roots to penetrate deeper and increases the moisture-holding capacity.

Capability unit VIe–1

The soils in capability unit VIe–1 are well drained and deep over bedrock. They have moderate to moderately slow permeability. The surface soil ranges in texture from loam to silty clay and is 4 to 8 inches thick. The subsoil ranges from silty clay to clay or sandy clay. It is yellowish red to dark red. Clay and sandy clay textures are dominant. The moderately long, steep slopes range from 20 to 30 percent.

The soils in this unit are—

Bolton silt loam, eroded steep phase.
Cumberland silty clay loam, eroded steep phase.
Cumberland and Decatur silty clay loams, severely eroded steep phases.
Dewey silty clay loam, eroded steep phase.
Dewey silty clay, severely eroded steep phase.
Farragut silty clay, severely eroded steep phase.
Fullerton silt loam, steep phase.
Fullerton silty clay loam, severely eroded steep phase.
Tellico loam, eroded steep phase.
Tellico clay loam, severely eroded steep phase.
Waynesboro loam, eroded steep phase.

All of these soils are medium acid to strongly acid. They are low to moderately high in fertility. Partly because of the steep slopes and rapid runoff, the moisture-supplying capacity is medium to low. The soils are highly susceptible to erosion, particularly sheet erosion.

The friable Tellico and Waynesboro soils are highly susceptible to gullying.

About one-third of the acreage of these soils is in badly cutover forest consisting of hardwood trees and a few pines. Most of the forest is on the Fullerton and Tellico soils. The cleared acreage is used mostly for pasture, but a small proportion is used for corn, small grains, and hay. Lespedeza is the most common crop, both for hay and for pasture.

Suitability and management.—Because of the steep slopes and the serious risk of erosion, these soils are not suited to crops and should be used only for pasture and forest. Gullied areas here and there are evidence that the soils cannot be conserved if cultivated. Under good management, good pasture can be established. All of the common grasses and legumes can be grown, including orchardgrass, fescue, bermudagrass, sericea lespedeza, and whiteclover.

These soils need lime and moderate applications of complete fertilizers. They should not be plowed except for reseeding pasture. Even then, tillage should be on the contour, and the long slopes should not be plowed their entire length. Runoff develops rapidly and sometimes destroys newly established pasture stands. Stands can best be established by using a succession of contour strips over a period of a few years. This method will reduce the risk of erosion and of failure to establish pasture. Grazing should be carefully controlled.

Capability unit VIe–2

The soils in capability unit VIe–2 are well drained, deep, and, generally, moderately permeable throughout. The surface soil is mostly cherty silt loam or gravelly loam, but some areas have a surface soil of cherty silty clay loam or gravelly clay loam. The subsoil is mainly yellowish red and red and includes textures of cherty silty clay loam, cherty clay, or gravelly sandy clay. The slopes are fairly long. The gradients range from 12 to 30 percent, but are mostly between 20 and 30 percent.

The soils in this unit are—

Clarksville cherty silt loam, steep phase.
Fullerton cherty silty clay loam, severely eroded moderately steep phase.
Fullerton cherty silt loam, steep phase.
Fullerton cherty silty clay loam, severely eroded steep phase.
Waynesboro gravelly loam, eroded steep phase.
Waynesboro gravelly clay loam, severely eroded moderately steep phase.
Waynesboro gravelly clay loam, severely eroded steep phase.

These soils are highly leached and light colored in the upper part of the profile. They are low in fertility and are strongly acid to very strongly acid. They contain very little organic matter. They are permeable to water and roots, but the steep slopes cause rapid runoff. They are highly susceptible to erosion but slightly less erodible than the more clayey soils of unit VIe–1. They have low moisture-supplying capacity and are droughty, partly because of the steep slopes and partly because the chert fragments and pebbles form a substantial part of the soil mass. The chert fragments and pebbles are mostly less than 3 inches in diameter but range up to 5 inches.

About 60 percent of the acreage is in forest. The remainder is used mainly for unimproved pasture. A very small acreage, distributed in small fields or patches, is used for corn, hay, and small grains. Lespedeza is the most common plant, both for pasture and for hay.

Suitability and management.—Because of steep slopes and high risk of erosion, these soils are not suited to crops. They cannot be maintained for long if cultivated. Even if they could be conserved by the use of elaborate soil conserving practices, their response and workability are too poor to make crop production profitable.

Fair to medium pastures can be established and maintained. All of the common pasture plants can be grown. Moderate to heavy applications of lime and fertilizers are needed.

These soils should not be plowed except for reseeding pasture. All tillage should be on the contour. On long, steep slopes, pasture should be established over a period of a few years by seeding a succession of contour strips. This method will reduce the risk of erosion and of failure to establish a stand. Because runoff develops rapidly, newly established pasture is likely to be partly destroyed if the entire slope is cultivated at one time.

If they are not needed for pasture, these soils should be planted to trees. Pine trees generally grow best, but some sites are suitable for poplar, walnut, and other hardwood trees.

Capability unit VIIe–1

The soils in capability unit VIIe–1 are deep and well drained and have moderate to moderately slow permeability. All of them are on long, very steep slopes. The gradients are more than 30 percent. The surface soil is mostly medium textured, and the subsoil is mostly clayey.

The soils in this unit are—

Clarksville cherty silt loam, very steep phase.
Fullerton cherty silt loam, very steep phase.
Fullerton cherty silty clay loam, severely eroded very steep phase.
Fullerton silt loam, very steep phase.
Tellico loam, very steep phase.
Tellico clay loam, severely eroded very steep phase.

The Tellico soils are moderate in fertility and are strongly acid; the other soils are low in fertility and are very strongly acid. All the soils are permeable, but, because of the very steep slopes, runoff is rapid and the erosion hazard is high.

About 80 percent of the acreage is in forest. The rest is used mainly for unimproved pasture. Some of the areas are reverting to volunteer pine.

Suitability and management.—These soils are too steep to be used for crops or pasture. Even when in pasture, they are very difficult to protect from erosion. Also, they are not very productive of pasture plants. They are best suited to forest. Cleared areas should be planted to trees. Shortleaf pine and loblolly pine are best suited, but hardwoods can be grown on some of the low slopes in the least eroded areas. The Tellico soils are more productive of hardwoods than are the other soils in this unit.

Capability unit VIIs–1

Capability unit VIIs–1 includes several soils and miscellaneous land types, all of which have one or more undesirable characteristics and are unsuitable for crops or pasture. The slopes range from 5 to 40 percent.

The soils and land types in this unit are—

Gullied land, limestone materials.
Gullied land, shale materials.
Lehew loam, steep phase.
Lehew loam, very steep phase.
Litz silt loam, steep phase.
Litz shaly silty clay loam, steep phase.
Made land.
Quarry.
Rockland.
Steekee loam, very steep phase.
Steekee shaly loam, very steep phase.
Talbott and Colbert very rocky soils, 5 to 25 percent slopes.

All of these areas are shallow and droughty. About 85 percent of the acreage is in forest, much of it second-growth pine.

Suitability and management.—Except for the small part not used for agricultural purposes, all of the acreage should be established in forest. Pine is the best suited species. Litz silt loam, steep phase, and the Talbott and Colbert very rocky soils will produce fair pasture, but even they are better suited to forest. Some of the more severely gullied areas need to be leveled before seedlings can become established.

Estimated Yields [2]

Estimates of yields of the principal crops grown in Loudon County, under defined management practices, are given in table 1. The defined practices constitute a higher level of management than is commonly followed. Under prevailing practices, yields generally are from 20 to 35 percent less.

The estimates are based on (1) yields obtained in long-term experiments; (2) yields harvested on farms in cooperative soil productivity-management studies; and (3) estimates by agronomists who have had much experience with the crops and soils in Loudon County.

Data on yields obtained in experiments were adjusted to reflect the combined effects of slope, weather, and levels of management. If such data were not available, estimates were made by using available data for similar soils. All estimates are based on average rainfall in the area, over a long period of time, and no irrigation. "Drained" refers chiefly to removal of excess surface water by open ditches. For alluvial soils it is assumed there is no overflow hazard; the effects of flooding must be considered locally.

Estimates are not given if the soil is not commonly used for, or is not suited to, a specific crop.

The defined management practices are based on research findings. For all crops, they include the following:

1. Fertilization at planting, in accordance with the needs indicated by chemical tests and by past cropping and fertilizing practices.
2. Use of crop varieties that are high yielding and suited to the area.
3. Adequate seedbed preparation.
4. Planting or seeding by suitable methods, at suitable rates, and at the right times.
5. Inoculation of legumes.
6. Shallow cultivation of row crops.
7. Control of weeds, insects, and diseases.
8. Use of soil-conserving cropping systems like those suggested in the subsection, Capability Units.
9. Water management where needed: sodding of waterways, contour cultivation, terracing, or contour stripcropping.
10. Protection from overgrazing.

The defined system of management also includes specific practices for each of the principal crops of the county.

Corn.—For corn, three levels of management are defined for three different levels of estimated productivity.

1. Soils that will yield 85 bushels or more per acre are excellent soils for corn. Practices upon which these estimates are based are—
   a. Applying 120 to 150 pounds of nitrogen per acre.
   b. Planting 12,000 to 16,000 plants per acre.
2. Soils that will yield 60 to 85 bushels per acre are good soils for corn. Practices upon which these estimates are based are—
   a. Applying 75 to 100 pounds of nitrogen per acre.
   b. Planting 8,000 to 12,000 plants per acre.
3. Soils that will yield 40 to 60 bushels per acre are only fair soils for corn. Practices upon which these estimates are based are—
   a. Applying 50 to 75 pounds of nitrogen per acre.
   b. Planting 8,000 plants per acre.

Soils that have an estimated potential yield of less than 40 bushels per acre under good management are poorly suited to corn and can more profitably be used for other crops.

Nitrogen may be supplied in the form of commercial fertilizer, barnyard manure, or leguminous residues, or any combination of these.

To estimate the yield of corn silage, a convenient rule of thumb is that plants yielding 5 bushels of corn will yield about 1 ton of silage. For example, a soil that yields 100 bushels per acre would produce approximately 20 tons of silage per acre. The rates of fertilization are the same for silage as for corn grown for grain. For silage, however, the plant population normally is greater and sorghum can be planted with the corn.

Burley tobacco.—Because burley tobacco usually is grown only on excellent tobacco soils, only one level of management is defined. Practices on which the estimates are based are—

1. Applying 100 to 130 pounds of nitrogen per acre at planting time.
2. Planting at the rate of 8,500 to 10,000 plants per acre and in areas not subject to flooding during the crop season.

Alfalfa.—Management practices upon which the estimates for alfalfa are based are—

1. Applying up to 15 pounds of nitrogen and 20 pounds of borax at seeding time.
2. Applying maintenance fertilizer annually, after the first year, either in amounts determined by soil tests or in the following proportions: 20 pounds of borax, at least 120 pounds of potash, and 30 pounds of phosphate per acre.
3. Mowing and controlling grazing properly; cutting no hay between about September 10 and the first killing frost.

[2] This section was prepared by D. K. Springer, soil scientist, Soil Conservation Service, and F. F. Bell, associate agronomist, University of Tennessee.

TABLE 1.—*Estimated average acre yields of principal crops under defined management*

[Estimated yields are based on average rainfall over a long period of time, without irrigation. Absence of figure indicates crop is not suitable for, or is not commonly grown on, the soil specified. "Defined management" described on pp. 19, 24, and 25]

Soil	Corn	Burley tobacco	Alfalfa	Red clover and perennial grass	Wheat		Oats		Barley		Lespedeza seeded alone	Lespedeza overseeded on small grain	Pasture	
					Nitrogen treatment		Nitrogen treatment		Nitrogen treatment				Sudangrass	Orchardgrass and white clover [1]
					Split 30–30	Fall 30	Split 30–30	Fall 30	Split 30–30	Fall 30				
	Bushels	*Pounds*	*Tons*	*Tons*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Alcoa loam:														
Gently sloping phase	75	2,300	3.4	2.6	30	26	60	52	38	33	1.8	0.9	85	160
Sloping phase	67	2,050	3.2	2.5	28	24	57	49	36	31	1.6	.8	75	150
Barbourville silt loam	85	2,300	3.0	2.6	28	24	55	47	36	31	2.0	1.0	100	180
Bland silty clay loam:														
Sloping phase	21			1.3	18	14	33	25			1.0	.5		75
Moderately steep phase					16	12	29	21			.8	.4		65
Bolton silt loam:														
Eroded sloping phase	64	1,950	3.2	2.5	28	23	57	47	36	29	1.5	.7	75	150
Eroded moderately steep phase	52	1,600	2.9		25	20	51	41	32	25	1.3	.6		135
Eroded steep phase														110
Clarksville cherty silt loam:														
Sloping phase	40	1,350			19	15	33	25	24	19	.8	.4		100
Moderately steep phase	34	1,100			17	13	30	22	21	16	.6	.3		90
Steep phase														75
Very steep phase														
Colbert silty clay loam, sloping phase	21			1.3	18	14	33	25			.8	.4		75
Congaree loam:														
Nearly level phase	100	2,300	3.0	2.8	28	24	55	47	36	31	2.0	1.0	100	180
Sloping phase	85	2,100	3.2	2.8	28	24	55	47	36	31	2.0	1.0	100	180
Cumberland silty clay loam:														
Eroded gently sloping phase	65	1,800	3.7	2.4	35	30	65	55	45	38	1.6	.8	75	150
Eroded sloping phase	56	1,550	3.5	2.3	33	28	62	52	43	36	1.4	.7	65	145
Severely eroded sloping phase	39	1,050	2.9	1.9	27	20	51	37	35	26	.9	.4	45	120
Eroded moderately steep phase	49	1,350	3.0		28	23	52	42	36	29	1.2	.6		120
Severely eroded moderately steep phase	28	800	2.2		21	14	39	25	27	18	.7	.3		90
Eroded steep phase														95
Cumberland gravelly clay loam:														
Eroded sloping phase	52	1,350	3.3	2.1	30	25	56	46	39	32	1.2	.6	60	135
Eroded moderately steep phase	45	1,150	2.8		26	21	47	37	33	26	1.0	.5	50	110
Cumberland and Decatur silty clay loams, severely eroded steep phases														
Decatur silty clay loam:														
Eroded gently sloping phase	65	1,800	3.7	2.4	35	30	65	55	45	38	1.6	.8	75	150
Eroded sloping phase	56	1,550	3.5	2.3	33	28	62	52	43	36	1.4	.7	65	145
Severely eroded sloping phase	39	1,050	2.9	1.9	27	20	51	37	35	26	.9	.4	45	120
Eroded moderately steep phase	49	1,350	3.0		28	23	52	42	36	29	1.2	.6		120
Decatur silty clay, severely eroded moderately steep phase	28	800	2.2		21	14	39	25	27	18	.7	.3		90
Dewey silty clay loam:														
Eroded gently sloping phase	65	1,800	3.7	2.4	35	30	65	55	45	38	1.6	.8	75	150
Eroded sloping phase	56	1,550	3.5	2.3	33	28	62	52	43	36	1.4	.7	65	145
Eroded moderately steep phase	49	1,350	3.0		28	23	52	42	36	29	1.2	.6		120
Eroded steep phase														95

See footnotes at end of table.

TABLE 1.—*Estimated average acre yields of principal crops under defined management*—Continued

[Estimated yields are based on average rainfall over a long period of time, without irrigation. Absence of figure indicates crop is not suitable for, or is not commonly grown on, the soil specified. "Defined management" described on pp. 19, 24, and 25]

Soil	Corn	Burley tobacco	Alfalfa	Red clover and perennial grass	Wheat		Oats		Barley		Lespedeza seeded alone	Lespedeza overseeded on small grain	Pasture	
					Nitrogen treatment		Nitrogen treatment		Nitrogen treatment				Sudangrass	Orchardgrass and white clover [1]
					Split 30–30	Fall 30	Split 30–30	Fall 30	Split 30–30	Fall 30				
	Bushels	*Pounds*	*Tons*	*Tons*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Dewey silty clay:														
Severely eroded sloping phase	39	1,050	2.9	1.9	27	20	51	37	35	26	0.9	0.4	45	120
Severely eroded moderately steep phase	28	800	2.2	-------	21	14	39	25	27	18	.7	.3	-------	90
Severely eroded steep phase	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Emory silt loam	90	2,300	3.0	2.8	30	26	55	47	38	33	2.0	1.0	100	180
Emory silty clay loam	75	2,100	2.8	2.6	26	21	47	37	33	26	1.8	.9	85	170
Etowah silt loam:														
Gently sloping phase	75	2,300	3.4	2.6	30	26	60	52	40	35	1.8	.9	85	160
Eroded sloping phase	64	1,950	3.2	2.5	28	23	57	47	38	31	1.5	.7	75	150
Eroded moderately steep phase	53	1,600	2.9	-------	25	20	51	41	34	27	1.3	.6	-------	135
Farragut silty clay loam:														
Eroded gently sloping phase	65	1,800	3.7	2.4	35	30	65	55	45	38	1.6	.8	75	150
Eroded sloping phase	56	1,550	3.5	2.3	33	28	62	52	43	36	1.4	.7	65	145
Eroded moderately steep phase	49	1,350	3.0	-------	28	23	52	42	36	29	1.2	.6	-------	120
Farragut silty clay:														
Severely eroded sloping phase	39	1,050	2.9	1.9	27	20	51	37	35	26	.9	.4	45	120
Severely eroded moderately steep phase	28	800	2.2	-------	21	14	39	25	27	18	.7	.3	-------	90
Severely eroded steep phase	------	------	------	------	------	------	------	------	------	------	------	------	------	95
Fullerton cherty silt loam:														
Sloping phase	45	1,450	2.4	2.1	30	26	57	49	39	34	1.3	.6	45	130
Moderately steep phase	37	1,250	2.1	-------	27	23	51	43	35	30	1.0	.5	-------	110
Steep phase	------	------	------	------	------	------	------	------	------	------	------	------	------	90
Very steep phase	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Fullerton cherty silty clay loam:														
Severely eroded moderate steep phase	20	650	1.5	-------	19	12	36	22	25	16	.6	.3	-------	80
Severely eroded steep phase	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Severely eroded very steep phase	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Fullerton silt loam:														
Gently sloping phase	70	1,950	3.4	2.4	35	31	65	57	45	40	1.7	.8	80	150
Sloping phase	63	1,750	3.2	2.3	33	29	62	54	43	38	1.4	.7	75	145
Moderately steep phase	52	1,450	2.9	-------	30	26	55	48	38	33	1.3	.6	-------	130
Steep phase	------	------	------	------	------	------	------	------	------	------	------	------	------	105
Very steep phase	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Fullerton silty clay loam:														
Severely eroded sloping phase	39	1,050	2.6	1.9	27	20	51	37	35	26	.9	.4	45	120
Severly eroded moderately steep phase	28	800	2.0	-------	21	14	39	25	27	18	.7	.3	-------	90
Severely eroded steep phase	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Greendale silt loam	85	2,100	2.8	2.8	28	24	55	47	36	31	2.0	1.0	100	180
Greendale cherty silt loam	70	2,050	2.3	2.6	26	22	51	43	33	28	1.8	.9	85	170
Gullied land:														
Limestone materials	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Shale materials	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Hermitage silt loam:														
Gently sloping phase	75	2,300	3.4	2.6	30	26	60	52	40	35	1.8	.9	85	160
Eroded sloping phase	64	1,950	3.2	2.5	28	23	57	47	38	31	1.5	.7	75	150

See footnotes at end of table.

TABLE 1.—*Estimated average acre yields of principal crops under defined management*—Continued

[Estimated yields are based on average rainfall over a long period of time, without irrigation. Absence of figure indicates crop is not suitable for, or is not commonly grown on, the soil specified. "Defined management" described on pp. 19, 24, and 25]

Soil	Corn	Burley tobacco	Alfalfa	Red clover and perennial grass	Wheat		Oats		Barley		Lespedeza seeded alone	Lespedeza overseeded on small grain	Pasture	
					Nitrogen treatment		Nitrogen treatment		Nitrogen treatment				Sudangrass	Orchardgrass and white clover [1]
					Split 30–30	Fall 30	Split 30–30	Fall 30	Split 30–30	Fall 30				
	Bushels	*Pounds*	*Tons*	*Tons*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Hermitage cherty silt loam, sloping phase	58	1,900	3.0	2.3	27	23	53	45	35	30	1.4	0.7	65	145
Huntington loam:														
Nearly level phase	100	2,300	3.0	2.8	28	24	55	47	36	31	2.0	1.0	100	180
Sloping phase	85	2,100	3.2	2.8	28	24	55	47	36	31	2.0	1.0	100	180
Landisburg silt loam:														
Gently sloping phase	55	1,950	2.5	2.0	24	20	50	42	26	21	1.6	.8	70	135
Eroded sloping phase	44	1,550	2.4	1.9	23	18	47	37	25	18	1.3	.6	55	130
Landisburg cherty silt loam, gently sloping phase	47	1,650	2.3	1.8	22	18	45	37	24	19	1.4	.7	65	125
Leadvale silt loam, gently sloping phase	50	1,850	2.0	2.0	24	20	50	42	26	21	1.5	.7	70	135
Lehew loam:														
Moderately steep phase	------	-------	1.6	-------	18	14	32	24	------	------	.9	.4	-------	65
Steep phase	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	55
Very steep phase	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------
Lindside silt loam (*drained*)	70	-------	------	2.5	25	21	55	47	25	20	2.0	1.0	95	160
Lindside silt loam (*not drained*)	55	-------	------	2.0	------	------	44	34	------	------	1.8	-------	85	140
Lindside silt loam, local alluvium phase (*drained*)	80	-------	------	2.5	25	21	55	47	25	20	2.0	1.0	95	160
Lindside silt loam, local alluvium phase (*not drained*)	70	-------	------	2.0	------	------	44	34	------	------	1.8	-------	85	140
Litz silt loam:														
Sloping phase	25	-------	1.8	1.3	22	18	43	35	26	19	1.1	.5	-------	85
Moderately steep phase	21	-------	1.6	-------	20	16	38	30	23	15	.9	.4	-------	75
Steep phase	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	65
Litz shaly silty clay loam:														
Sloping phase	14	-------	1.2	.9	15	8	29	15	17	8	.6	.3	-------	60
Moderately steep phase	------	-------	.9	-------	------	------	------	------	------	------	-------	-------	-------	45
Steep phase	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------
Lobelville cherty silt loam (*drained*)	55	-------	------	2.5	25	21	55	47	25	20	2.0	1.0	95	160
Lobelville cherty silt loam (*not drained*)	45	-------	------	2.0	------	------	44	34	------	------	1.8	-------	85	140
Made land	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------
Melvin silt loam (*drained*)	55	-------	------	-------	------	------	------	------	------	------	1.8	-------	85	135
Melvin silt loam (*not drained*)	------	-------	------	-------	------	------	------	------	------	------	.6	-------	-------	[3] 125
Minvale silt loam:														
Gently sloping phase	70	2,100	3.2	2.6	30	26	60	52	40	35	1.8	.9	85	160
Eroded sloping phase	59	1,800	3.0	2.5	28	23	57	47	38	31	1.5	.7	70	150
Minvale cherty silt loam, eroded sloping phase	51	1,800	2.8	2.3	26	21	53	43	35	28	1.4	.7	65	145
Neubert loam	85	2,100	3.0	2.8	28	24	55	47	36	31	2.0	1.0	100	180
Nolichucky gravelly fine sandy loam:														
Sloping phase	49	1,450	2.4	2.1	28	24	57	49	38	33	1.3	.6	65	130
Eroded moderately steep phase	38	1,150	2.0	-------	24	19	48	38	32	25	1.0	.5	-------	105
Quarry	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------
Robertsville silt loam (*drained*)	45	-------	------	-------	------	------	------	------	------	------	1.2	-------	-------	[3] 105
Robertsville silt loam (*not drained*)	------	-------	------	-------	------	------	------	------	------	------	1.0	-------	-------	[3] 90
Rockland	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------
Sequatchie fine sandy loam, gently sloping phase	70	2,300	2.9	2.6	30	26	60	52	40	35	1.7	.8	80	16

See footnotes at end of table.

TABLE 1.—*Estimated average acre yields of principal crops under defined management*—Continued

[Estimated yields are based on average rainfall over a long period of time, without irrigation. Absence of figure indicates crop is not suitable for, or is not commonly grown on, the soil specified. "Defined management" described on pp. 19, 24, and 25]

Soil	Corn	Burley tobacco	Alfalfa	Red clover and perennial grass	Wheat		Oats		Barley		Lespedeza seeded alone	Lespedeza overseeded on small grain	Pasture	
					Nitrogen treatment		Nitrogen treatment		Nitrogen treatment				Sudangrass	Orchard grass and white clover [1]
					Split 30–30	Fall 30	Split 30–30	Fall 30	Split 30–30	Fall 30				
	Bushels	*Pounds*	*Tons*	*Tons*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Sequatchie loam:														
Gently sloping phase	75	2,300	2.9	2.6	30	26	60	52	40	35	1.8	0.9	85	160
Sloping phase	67	2,050	2.8	2.5	28	24	57	49	38	33	1.6	.8	75	150
Sequoia silty clay loam:														
Eroded gently sloping phase	50	1,650	2.9	2.2	28	23	57	47	33	26	1.4	.7	65	140
Eroded sloping phase	40	1,350	2.6	2.0	25	20	51	41	30	23	1.1	.5	50	125
Eroded moderately steep phase	33	1,100	2.1	-------	21	16	42	32	24	17	.9	.4	-------	100
Sequoia silt loam, sloping phase	47	1,550	2.7	2.1	27	23	54	46	31	26	1.3	.6	60	130
Sequoia silty clay:														
Severely eroded sloping phase	25	850	1.8	1.4	18	11	36	22	21	12	.7	.3	30	85
Severely eroded moderately steep phase	14	500	1.4	-------	13	6	27	13	16	7	.4	.2	-------	65
Steekee loam:														
Moderately steep phase	19	-------	1.6	-------	18	14	32	24	20	15	.8	.4	-------	75
Very steep phase	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------
Steekee shaly loam, very steep phase	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------
Taft silt loam	45	-------	------	1.2	18	12	40	30	------	------	1.3	.6	-------	125
Talbott silty clay loam, eroded sloping phase	37	1,150	2.6	1.7	22	17	42	32	25	18	1.0	.5	45	110
Talbott silty clay:														
Severely eroded sloping phase	23	700	1.8	1.2	16	9	30	16	17	8	.6	.3	25	80
Severely eroded moderately steep phase	13	400	1.4	-------	------	------	------	------	------	------	.4	-------	-------	60
Talbott and Colbert very rocky soils, 5 to 25 percent slopes	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------
Tellico loam:														
Eroded sloping phase	52	1,550	3.2	2.1	33	28	62	52	43	36	1.3	.6	60	135
Eroded moderately steep phase	45	1,350	2.7	-------	28	23	52	42	36	29	1.1	.5	-------	115
Eroded steep phase	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	90
Very steep phase	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------
Tellico clay loam:														
Severely eroded sloping phase	36	1,050	2.6	1.7	27	20	51	37	35	26	.9	.4	35	120
Severely eroded moderately steep phase	26	800	2.0	-------	21	14	39	25	27	18	.6	.3	-------	85
Severely eroded steep phase	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------
Severely eroded very steep phase	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------
Waynesboro loam:														
Eroded gently sloping phase	65	2,000	3.5	2.4	35	30	65	55	45	38	1.6	.8	75	150
Sloping phase	63	1,900	3.3	2.3	33	29	62	54	43	38	1.5	.7	75	145
Eroded sloping phase	56	1,700	3.3	2.3	33	28	62	52	43	36	1.4	.7	65	145
Eroded moderately steep phase	49	1,450	2.8	-------	28	23	52	42	36	29	1.2	.6	-------	120
Eroded steep phase	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	95
Waynesboro gravelly loam:														
Eroded sloping phase	48	1,450	2.4	2.1	28	23	57	47	38	31	1.1	.5	60	130
Eroded moderately steep phase	42	1,300	2.0	-------	24	19	48	38	32	25	1.0	.5	-------	105
Eroded steep phase	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	85

See footnotes at end of table.

TABLE 1.—*Estimated average acre yields of principal crops under defined management*—Continued

[Estimated yields are based on average rainfall over a long period of time, without irrigation. Absence of figure indicates crop is not suitable for, or is not commonly grown on, the soil specified. "Defined management" described on pp. 19, 24, and 25]

Soil	Corn	Burley tobacco	Alfalfa	Red clover and perennial grass	Wheat		Oats		Barley		Lespedeza seeded alone	Lespedeza overseeded on small grain	Pasture	
					Nitrogen treatment		Nitrogen treatment		Nitrogen treatment				Sudangrass	Orchardgrass and whiteclover [1]
					Split 30–30	Fall 30	Split 30–30	Fall 30	Split 30–30	Fall 30				
	Bushels	*Pounds*	*Tons*	*Tons*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Waynesboro gravelly clay loam:														
Severely eroded moderately steep phase	36	750	1. 5	-------	18	11	36	22	24	15	0. 6	0. 3	-------	80
Severely eroded steep phase	------	-------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------
Waynesboro clay loam, severely eroded moderately steep phase	28	850	2. 1	-------	21	14	39	25	27	18	. 7	. 3	-------	90
Wolftever silt loam	50	1, 650	2. 5	2. 0	24	20	50	42	26	21	1. 6	. 8	65	135

[1] Ladino clover may be substituted for white clover.

[2] Number of days 1 acre will graze a cow, horse, or steer, or 5 swine, or 7 sheep without injury to the pasture.

[3] Yield is for tall fescue or bermudagrass and whiteclover, rather than orchardgrass and whiteclover.

Estimated yields of alfalfa on alluvial soils apply only if ponding or flooding is not a hazard.

Red clover and cool-season perennial grasses.—Practices upon which the estimated yields for red clover and cool-season perennial grasses are based are—

1. Applying up to 15 pounds of nitrogen per acre at seeding if clover and grass are seeded in fall.
2. Applying 30 pounds of nitrogen per acre in fall, if grass and a small grain are seeded in fall and clover is overseeded early in the following spring; omitting a spring topdressing of nitrogen, to lessen competition from the small grain.

The yield estimates are for the calendar year after clover is seeded; that is, for the summer following a fall seeding, and for the next year if clover is overseeded in spring. Usually, only half a ton or less of hay and grain stubble can be expected during the year of seeding in the small grain.

Small grains.—Two estimated yields of wheat, oats, and barley are given, based on two levels of nitrogen applications. These are—

1. A split application of 30 pounds of nitrogen at seeding time and 30 pounds in the spring as a topdressing.
2. A single application of 30 pounds of nitrogen in the fall at seeding time.

A short method of approximating the yield of the oat crop as hay is to divide the number of bushels of oats by 31. The result will be the yield of hay in tons. The same result is obtained by converting the estimated grain yield from bushels to pounds, multiplying this figure by 2 (since the weight of straw is approximately equal to the weight of grain), and converting the result to tons.

Korean and Kobe lespedeza.—Two estimates are given for lespedeza. The practices on which the estimates are based are—

1. Seeding in spring on a prepared seedbed, or volunteer seeding.
2. Overseeding on barley or wheat that received a split application of nitrogen consisting of 30 pounds in the fall and 30 pounds in the spring and was harvested for grain. Oats are less desirable for an overseeding of lespedeza, since they tend to be more competitive than barley or wheat.

Annual yields of lespedeza grown by the second method have been estimated to be 50 percent less than yields of lespedeza seeded alone. Research and field observations indicate that the overseeding method results in nearly complete failure of the lespedeza crop 1 out of every 2 years.

If lespedeza is overseeded on small grain that received a single fall application of 30 pounds of nitrogen and is to be harvested for grain, the yield will be about 60 percent as much as the yield of lespedeza seeded alone.

If the small grain is harvested for hay after receiving the split 30-30 nitrogen treatment, the probability of a failure of the lespedeza crop is less. Under this system, the yield of lespedeza can usually be expected to be 80 percent as much as the yield of lespedeza seeded alone.

Sudangrass or millet.—The practices on which the estimated yields are based are—

1. Applying approximately 90 pounds of nitrogen per acre for soils that generally have high moisture-supplying capacity and estimated yields of 85 or more cow-acre-days of grazing per acre.
2. Applying approximately 60 pounds of nitrogen per acre for soils that generally have medium to low moisture-supplying capacity and estimated yields of less than 85 cow-acre-days of grazing per acre.

The estimated yield of cow-acre-days of grazing was computed by estimating, first, the yield of air-dry forage in tons per acre obtained from three or four clippings

made during the growing season. It was assumed that an animal unit consumes the equivalent of approximately 30 pounds of air-dry forage per day of grazing and that rotational grazing generally utilizes 50 to 60 percent of the growth of the grass. The estimated yield was converted to cow-acre-days of grazing by converting tons of air-dry forage per acre to pounds, multiplying this by one-half, and dividing the result by 30. The tons of air-dry forage can be computed by dividing the number of cow-acre-days by 33.

Orchardgrass and ladino and other white clovers.—The practices on which yields for pasture mixtures of orchardgrass and ladino and other white clovers are based are—

1. Applying 30 pounds of nitrogen at seeding time.
2. Applying up to 30 pounds of nitrogen as topdressing annually, late in February, if there is an insufficient amount of clover in the mixture.
3. Applying phosphate and potash annually, after the first year.

Yield estimates have been omitted for all very steep soils; for all severely eroded, steep soils; and for all steep phases of Clarksville, Lehew, and Litz soils. Normally, orchardgrass would not be so long lived on these soils as would bermudagrass, bluegrass, or tall fescue. Very steep soils generally have a high erosion hazard during the period of seedbed preparation and establishment of sod. Pastures on such soils are normally difficult to mow and fertilize. Forestry usually offers more profitable returns than pasture over a period of years.

Estimated yields of orchardgrass have also been omitted for the poorly drained Robertsville soils and for undrained Melvin soils. Even if a stand of orchardgrass is obtained on these soils, its life generally is short. Whiteclover and tall fescue, bermudagrass, redtop, and other grasses are more water tolerant and have a longer productive life than orchardgrass.

The number of cow-acre-days of grazing was computed by estimating, first, the yield of air-dry clipped forage in tons per acre. About one-third less forage will be removed by grazing than by clipping and removing as hay or silage. It was assumed that an animal unit would consume the equivalent of 25 to 30 pounds of air-dry grass-clover mixture per day. The estimated yield was converted to cow-acre-days of grazing by converting tons of air-dry clipped forage to pounds, multiplying this figure by two-thirds, and dividing the result by 25. The tons of air-dry forage can be computed from table 1 by dividing the number of cow-acre-days by 53.

Use of Soils for Woodland [3]

The original forest in Loudon County consisted mostly of oak, hickory, and chestnut. Shortleaf pine and Virginia pine were prominent, and on the more favorable sites the stands were dominated by yellow-poplar, black cherry, black walnut, basswood, and red maple. Little of the area was cleared until after the Revolutionary War, when settlers who migrated from the Atlantic seaboard began to clear plots on which to grow corn and vegetables for their own subsistence and grain and pasture for their animals. Much more timber was cut than could possibly be used, and the excess was usually burned.

Most of the commercial lumbering took place after 1900. By 1930, practically all of the accessible timber had been cut. Added to the damage done by man was the spectacular destruction of the chestnut trees, once prominent in the hardwood forest, by the chestnut blight disease.

At present about one-third of the county is forested. Much of the acreage is fairly well stocked with desirable kinds of trees, but in many places production is poor. Removing shortleaf pine and leaving no seed trees has allowed low-quality hardwood trees to become reestablished. Virginia pine has grown up on denuded soils and abandoned cropland. Most of the woodland is in small farm woodlots.

Better woodland management practices, including prevention of fires, limitation of woodland grazing, and reforestation of marginal areas, are now being adopted. A few plantations of loblolly pine were planted in the late 1930's. The results indicate that loblolly pine grows well in this county.

Landowners who are interested in reforesting and in getting better returns from existing woodland can get advice and assistance from the county extension staff, the Soil Conservation Service, or State farm foresters.

Woodland suitability groups

On the basis of relative suitability for the production of trees, the soils have been placed in 10 woodland suitability groups, which are described in the following paragraphs. Table 2 shows what soils are in each woodland suitability group and gives the site indexes for the principal kinds of trees and some of the factors that affect woodland management. The seriousness of the management problems is indicated by rating each of these factors as slight, moderate, or severe.

Woodland suitability group 1.—This group consists of soils of the Barbourville, Congaree, Emory, Greendale, Huntington, Neubert, and Sequatchie series. These soils occur on first bottoms, low stream terraces, and base slopes. They are the best soils in the county for growing trees. They are deep, friable, permeable, well drained, and fertile. They permit maximum root expansion and provide an abundant supply of moisture and an adequate and sustained supply of nutrients. The organic-matter content is moderate to high. The reaction is medium acid to neutral.

These soils are well suited to high-value native hardwoods, including black cherry, black walnut, and yellow-poplar.

Woodland suitability group 2.—This group consists of soils of the Alcoa, Etowah, Hermitage, and Minvale series. These soils occur on benches and foot slopes. They are slightly less well suited to trees than the soils in group 1. They are deep, permeable, well drained, friable, and highly fertile. The moisture-supplying capacity is high. The acidity is slightly stronger than in the soils in group 1.

These soils are well suited to hardwoods, including black cherry, black walnut, and yellow-poplar.

[3] This section was prepared by A. N. QUAM, woodland conservationist, Soil Conservation Service, Knoxville, Tennessee.

TABLE 2.—*Woodland suitability groups and factors affecting woodland management*

Woodland suitability group, soil series, and map symbols	Site indexes [1]	Plant competition [2]	Equipment limitation [3]	Seedling mortality [4]	Windthrow hazard [5]	Suitable species, in order of priority	Erosion hazard [6]	Remarks
Group 1 Barbourville (Ba). Congaree (CoA, CoC). Emory (Em, Er). Greendale (Gc, Ge). Huntington (HnA, HnC). Neubert (Ne). Sequatchie (SaB, ScB, ScC).	Shortleaf pine, 81–85; Virginia pine, 76–80; upland oaks, 81–85; yellow-poplar, 101–105.	Severe	Moderate	Slight	Slight	Black cherry, black walnut, yellow-poplar, loblolly pine, shortleaf pine.	Slight	Well-drained bottoms, hollows, and coves.
Group 2 Alcoa (AcB, AcC). Etowah (EtB, EtC2, EtD2). Hermitage (HcC, HeB, HeC2). Minvale (MrC2, MsB, MsC2).	Shortleaf pine, 76–80; Virginia pine, 71–75; upland oaks, 76–80; yellow-poplar, 96–100.	Moderate	Moderate	Slight	Slight	Black cherry, black walnut, yellow-poplar, loblolly pine, shortleaf pine.	Slight to moderate.	Well-drained lower slopes (colluvial) and benches.
Group 3 Lindside (Ln, Lo, Ha, Hb). Lobelville (Lu).	Shortleaf pine, 76–80; Virginia pine, 71–75; upland oaks, 76–80; yellow-poplar, 96–100.	Severe	Severe	Slight	Moderate	Loblolly pine, yellow-poplar, upland hardwoods.	Slight	Subject to occasional flooding.
Group 4 Bolton (BoC2, BoD2, BoE2). Tellico (TgC3, TgD3, TgE3, TgF3, TlC2, TlD2, TlE2, TlF). Waynesboro (WlB2, WlC, WlC2, WlD2, WlE2, WgC2, WgD2, WgE2, WkD3, WkE3, WmD3).	Shortleaf pine, 71–75; Virginia pine, 66–70; upland oaks, 71–75; yellow-poplar, 91–95.	Moderate	Moderate	Slight	Slight	Loblolly pine, yellow-poplar, shortleaf pine, redcedar, upland hardwoods, Virginia pine.	Moderate to severe.	
Group 5 Clarksville (CaC, CaD, CaE, CaF). Fullerton (FcC, FcD, FcE, FcF, FdD3, FdE3, FdF3, FsB, FsC, FsD, FsE, FsF, FtC3, FtD3, FtE3). Nolichucky (NoC, NoD2).	Shortleaf pine, 71–75; Virginia pine, 66–70; upland oaks, 71–75; yellow-poplar, 91–95.	Moderate	Moderate	Slight	Slight	Loblolly pine, shortleaf pine, Virginia pine, redcedar, upland hardwoods.	Moderate	
Group 6 Cumberland (CmB2, CmC2, CmC3, CmD2, CmD3, CmE2, CuC2, CuD2, CrE3). Decatur DcB2, DcC2, DcC3, DcD2, DcD3). Dewey (DeB2, DeC2, DeD2, DeE2, DwC3, DwD3, DwE3). Farragut (FaB2, FaC2, FaD2, FbC3, FbD3, FbE3).	Shortleaf pine, 71–75; Virginia pine, 66–70; upland oaks, 71–75; yellow-poplar, 91–95.	Moderate	Moderate	Slight	Slight	Loblolly pine, shortleaf pine, Virginia pine, redcedar, upland hardwoods.	Moderate	
Group 7 Sequoia (SeC, SkB2, SkC2, SkD2, SlC3, SlD3). Talbott (TbC2, TcC3, TcD3).	Shortleaf pine, 66–70; Virginia pine, 61–65; upland oaks, 66–70; yellow-poplar, 86–90.	Slight	Moderate	Slight	Moderate	Shortleaf pine, Virginia pine, redcedar.	Moderate to severe.	

Group 8 Lehew (LhD, LhE, LhF). Litz (LsC, LsD, LsE, LtC, LtD, LtE). Steekee (StD, StF, SvF).	Shortleaf pine, 66–70; Virginia pine, 61–65; upland oaks, 66–70; yellow-poplar, 86–90.	Slight	Moderate	Moderate	Severe	Shortleaf pine, Virginia pine, redcedar.	Severe	Shallow soils, 0 to 18 inches to bedrock.
Group 9 Landisburg (LcB, LdB, LdC2). Leadvale (LeB). Melvin (Me) Robertsville (Rb). Taft (Ta). Wolftever (Wo).	Shortleaf pine, 61–65; Virginia pine, 55–60; upland oaks, 61–65; yellow-poplar, 81–85.	Moderate	Severe	Slight	Moderate	Loblolly pine, yellow-poplar, shortleaf pine, Virginia pine, redcedar.	Slight	Poorly drained; shallow pans; Melvin soil subject to flooding.
Group 10 Bland (BnC, BnD). Colbert (CbC, Td). Gullied land (Gl, Gs). Rockland (Ro). Talbott (Td).	Shortleaf pine, 55–60; Virginia pine, 51–55; upland oaks, 55–60; yellow-polpar, 76–80.	Slight	Moderate to severe.	Moderate to severe.	Severe	Redcedar, Virginia pine, shortleaf pine, loblolly pine.	Severe	

[1] The site index is the height, in feet, that a tree of a given species, growing on a given soil, in an even-aged, well-managed stand, will attain in 50 years.

[2] A rating of slight indicates that plant competition does not impede the natural regeneration of the designated species; a rating of moderate, that competition may delay but does not prevent regeneration; and a rating of severe, that natural regeneration cannot be relied upon to restock the site and that seedlings must be planted and measures taken to remove competing plants.

[3] A rating of slight indicates that any kind of equipment commonly used in crop tending or tree harvesting can be used at any time of the year; a rating of moderate, that most types of equipment can be used and that there are periods of no more than 3 months when the use of equipment is restricted; a rating of severe, that the kinds of equipment that can be used are limited and that, for periods of 3 months or more, equipment cannot be used without danger of serious damage to the soil.

[4] A rating of slight indicates that ordinarily no more than 25 percent of either planted or naturally occurring seedlings will die, and that one planting will probably produce a satisfactory stand; a rating of moderate indicates that losses will be between 25 and 50 percent; and a rating of severe, that more than half the seedlings will die.

[5] A rating of slight indicates that individual trees will withstand normal winds, even when released on all sides; a rating of moderate, that trees will remain standing unless the wind is of high velocity or the soil is excessively wet; a rating of severe, that the soil does not allow adequate rooting for stability.

[6] Refers to potential erosion hazard when area is managed according to current acceptable standards.

Woodland suitability group 3.—This group consists of soils of the Lindside and Lobelville series. These soils occur on bottom lands. They are friable and permeable, but they are flooded occasionally and have a high water table, and consequently the root zone is somewhat restricted.

The species to which these soils are best suited are loblolly pine and yellow-poplar.

Woodland suitability group 4.—This group consists of soils of the Bolton, Tellico, and Waynesboro series. These soils are on the uplands. The moisture supply varies, depending on position on the slope. Generally, it is moderate, and in all places it is adequate. The fertility is adequate.

These soils are well suited to loblolly pine and shortleaf pine. In the coves and on the lower slopes, yellow-poplar and some of the upland hardwoods do well.

Woodland suitability group 5.—This group consists of soils of the Clarksville, Fullerton, and Nolichucky series. These soils provide adequate root space but are low to moderate in moisture-supplying capacity. They are deep, well drained, and strongly acid. The organic-matter content is low, and the fertility is low. The permeability is moderate to moderately slow.

These soils are well suited to loblolly pine, shortleaf pine, Virginia pine, and redcedar (fig. 8). Some of the more valuable upland hardwoods will grow in coves and other moist spots.

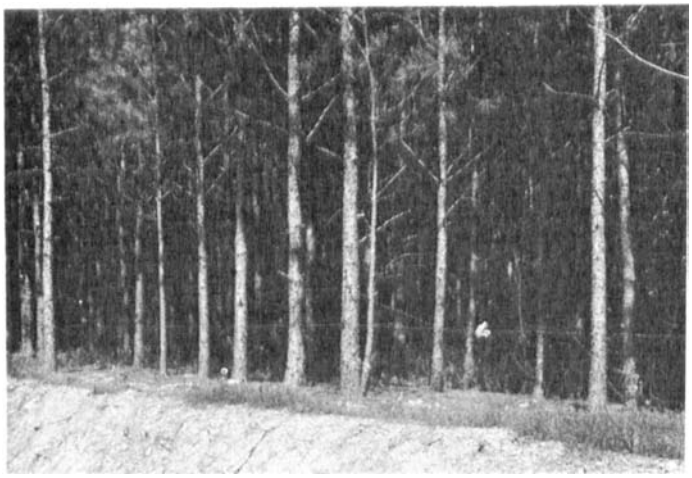

Figure 8.—**Pine plantation on Fullerton cherty silty clay loam, severely eroded moderately steep phase.**

Woodland suitability group 6.—This group consists of soils of the Cumberland, Decatur, Dewey, and Farragut series. These soils are deep, but they have a clayey, moderately permeable subsoil. There is ample room for root development but a shortage of available moisture. The moisture-holding capacity is fairly high, but in the subsoil the moisture is tightly held. The fertility is moderate.

These soils are better suited to loblolly pine, shortleaf pine, and Virginia pine than to hardwoods. Redcedar grows very well.

Woodland suitability group 7.—This group consists of soils of the Sequoia and Talbott series. These soils are only moderately deep over shale or limestone bedrock, and the moisture-supplying capacity is low to medium. Internal drainage is generally adequate. The fertility is low, the organic-matter content is low, and the reaction is strongly acid.

The species to which these soils are best suited are shortleaf pine, Virginia pine, and redcedar.

Woodland suitability group 8.—This group consists of soils of the Lehew, Litz, and Steekee series. These soils are not well suited to woodland. The root zone is severely restricted, the moisture-supplying capacity is very low, the organic-matter content is low, and the fertility is low.

Virginia pine and redcedar will grow better than other species. Shortleaf pine will do fairly well in the moister spots.

Woodland suitability group 9.—This group consists of soils of the Landisburg, Leadvale, Melvin, Robertsville, Taft, and Wolftever series. These soils become saturated quickly and do not drain readily. Some are poorly drained soils on bottom lands and upland flats and some have a pan, or slowly permeable layer, at a depth of about 2 feet.

The Melvin soils are suited to sweetgum and yellow-poplar; the other soils are fair to good for loblolly pine and yellow-poplar. Artificial drainage would be beneficial.

Woodland suitability group 10.—This group consists of Bland, Colbert, and Talbott soils, Gullied land, and Rockland. All areas are poor for woodland. The soils are shallow or severely eroded, the moisture-supplying capacity is low, and the fertility is low to moderate.

Virginia pine, shortleaf pine, and redcedar are the species best suited to these areas.

Woodland productivity

Table 3 shows the average production per acre for normal, unmanaged stands of shortleaf pine and loblolly pine of different ages and site indexes.

Engineering Characteristics of the Soils[4]

This soil survey report contains information that can be used by engineers to—

1. Make soil and land use studies that will aid in selecting and developing industrial, business, residential, and recreational sites.
2. Make preliminary estimates of the engineering properties of soils for use in the planning of agricultural drainage systems, farm ponds, irrigation systems, and diversion terraces.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting highway and airport locations and in planning detailed investigations of the selected locations.
4. Locate probable sources of gravel and other construction materials.

[4] NORMAN YOUNG, soils engineer, Materials and Test Division, Tennessee State Highway Department, assisted with the development of this section.

TABLE 3.—*Average production per acre for normal unmanaged stands of shortleaf pine and loblolly pine*

[From USDA Miscellaneous Publication No. 50, 1929]

Site index and age of stand	Total production			Average annual production		
	Cubic feet, unpeeled	Cords of rough wood	Board feet (Doyle rule)	Cubic feet, unpeeled	Cords of rough wood	Board feet (Doyle rule)
SHORTLEAF PINE						
Site index 50						
20 years						
30 years	2,040	23		68	0.77	
40 years	2,980	33		75	.82	
50 years	3,970	43	1,600	79	.86	32
60 years	4,430	48	3,200	74	.80	53
70 years	4,780	51	5,050	68	.73	72
80 years	5,050	53	7,000	63	.66	88
Site index 60						
20 years	1,060	12		53	.60	
30 years	2,880	32		96	1.07	
40 years	4,200	46	1,550	105	1.15	39
50 years	5,080	54	4,350	102	1.08	87
60 years	5,690	60	7,600	95	1.00	127
70 years	6,170	65	10,250	88	.93	146
80 years	6,520	68	12,700	82	.85	159
Site index 70						
20 years	1,600	18		80	.90	
30 years	3,720	41	750	124	1.37	25
40 years	5,210	56	4,000	130	1.40	100
50 years	6,250	66	8,650	145	1.32	173
60 years	7,000	73	12,600	117	1.22	210
70 years	7,580	79	16,250	108	1.13	232
80 years	8,020	83	19,400	100	1.04	242
Site index 80						
20 years	2,190	25		110	1.25	
30 years	4,420	48	1,950	147	1.60	65
40 years	6,100	65	7,650	152	1.62	191
50 years	7,380	77	13,550	148	1.54	271
60 years	8,250	85	18,850	138	1.42	314
70 years	8,920	92	23,450	127	1.31	335
80 years	9,460	97	27,550	118	1.21	344
Site index 90						
20 years	2,660	30		133	1.5	
30 years	5,050	54	4,550	168	1.8	152
40 years	7,000	73	12,600	175	1.82	315
50 years	8,450	87	20,450	169	1.74	409
60 years	9,500	98	27,400	158	1.63	457
70 years	10,280	105	32,850	147	1.5	469
80 years	10,910	112	37,400	136	1.4	468
LOBLOLLY PINE						
Site index 60						
20 years	1,500	12		75	.60	
30 years	2,750	25		92	.83	
40 years	3,700	35	1,000	92	.88	25
50 years	4,300	41	3,000	86	.82	60
60 years	4,700	46	5,000	78	.77	83
70 years	5,000	49	7,000	71	.70	100
80 years	5,200	51	8,500	65	.64	106
Site index 70						
20 years	1,900	17		95	.85	
30 years	3,350	31	1,000	112	1.03	33
40 years	4,500	42	3,500	112	1.05	88
50 years	5,200	50	6,500	104	1.00	130
60 years	5,700	55	10,000	95	.92	167
70 years	6,000	59	12,500	86	.84	179
80 years	6,200	62	15,000	77	.78	188

TABLE 3.—*Average production per acre for normal unmanaged stands of shortleaf pine and loblolly pine*—Continued

Site index and age of stand	Total production			Average annual production		
	Cubic feet, unpeeled	Cords of rough wood	Board feet (Doyle rule)	Cubic feet, unpeeled	Cords of rough wood	Board feet (Doyle rule)
Site index 80						
20 years	2, 350	22	----------	118	1. 10	----------
30 years	4, 000	38	2, 000	133	1. 27	67
40 years	5, 300	51	6, 000	132	1. 28	150
50 years	6, 150	60	11, 500	123	1. 20	230
60 years	6, 650	66	16, 000	111	1. 10	267
70 years	7, 000	70	19, 500	100	1. 00	279
80 years	7, 300	73	22, 000	91	. 91	275
Site index 90						
20 years	2, 850	27	----------	143	1. 35	----------
30 years	4, 700	46	4, 000	157	1. 53	133
40 years	6, 200	61	10, 000	155	1. 52	250
50 years	7, 200	71	16, 500	144	1. 42	330
60 years	7, 800	78	22, 000	130	1. 30	367
70 years	8, 200	82	26, 000	117	1. 17	371
80 years	8, 550	85	29, 000	107	1. 06	362

5. Correlate performance of engineering structures with soil mapping units and thus develop information that will be useful in designing and maintaining the structures.
6. Determine the suitability of soil units for cross-country movements of vehicles and construction equipment.
7. Supplement information obtained from other published maps and reports and aerial photographs for the purpose of making maps and reports that can be used readily by engineers.
8. Develop other preliminary estimates for construction purposes pertinent to the particular area.

This report will not eliminate the need for sampling and testing for design and construction of specific engineering works. It should be used primarily in planning more detailed field investigations to determine the in-place condition of the soil at the proposed construction site. The depth of sampling must be considered a limiting factor by the engineers. Excavations generally extend to much greater depths.

Some of the terms used by the agricultural soil scientist may be unfamiliar to the engineer, and some words—for example, soil, clay, silt, sand, topsoil, aggregate, and granular—may have special meanings in soil science. These terms are defined in the Glossary.

To make the best use of the soil map and the soil survey report, the engineer should know the physical properties of the soil materials and the in-place condition of the soil. After testing the soil materials and observing the behavior of each soil when used in engineering structure and foundations, the engineer can develop design recommendations for each soil unit delineated on the map.

Engineering Classification of Soils

Most highway engineers classify soil materials in accordance with the AASHO method (*1*).[5] In this system there are seven principal groups. They range from A-1, which consists of gravelly soils of high bearing capacity, to A-7, which consists of clay soils having low strength when wet. Within each group the relative engineering value of the soil material is indicated by a group index number. These range from 0 for the best materials to 20 for the poorest. The group index number is shown in parentheses following the soil group symbol.

Some engineers prefer the Unified soil classification system (*7*). In this system, soil materials are identified as coarse grained (8 classes), fine grained (6 classes), or highly organic.

The classification of a soil material by either the AASHO or the Unified system identifies that soil material with regard to gradation and plasticity characteristics. The classification permits the engineer to make a rapid appraisal of this soil material through association with more familiar soils that have the same classification.

Engineering Test Data

Soil samples from the principal soil types of each of seven extensive soil series were tested in accordance with standard procedures (*1*) to help evaluate the soils for engineering purposes. The test data are given in table 4. Because the samples tested were generally obtained from depths of less than 6 feet, they do not represent materials that are encountered in earthwork at greater depths.

In the moisture-density (compaction) test, soil material is compacted into a mold several times with a constant compactive effort, each time at a successively higher moisture content. The dry density (unit weight) of the soil material increases as the moisture content increases until the optimum moisture content is reached. After that, the dry density decreases with increase in moisture content. The highest dry density obtained in the compaction test is termed "maximum dry density." Moisture-density data are important in earthwork because, as a rule, optimum stability is obtained if the soil is compacted

[5] Italic numbers in parentheses refer to Literature Cited, p. 110.

to about the maximum dry density when it is at approximately the optimum moisture content.

The results of the mechanical analysis may be used to determine the relative proportions of the different size particles. The clay content obtained by the hydrometer method should not be used in naming soil textural classes.

The liquid limit and the plasticity index indicate the effect of water on the consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a solid to a semisolid, or plastic, state. As the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the material passes from a solid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

Table 4 also gives two engineering classifications for each soil sample. These classifications, based upon the liquid limit, the plasticity index, and the data obtained by mechanical analysis, are briefly described in the subsection, Engineering Classification of Soils.

TABLE 4.—*Engineering*

[Tests performed by the Bureau of Public Roads in accordance with standard

Soil name and location	Parent material	Bureau of Public Roads report No.	Depth	Horizon	Moisture-density		Mechanical analysis [1]
					Maximum dry density	Optimum moisture	Fragments more than 3 inches in size discarded in field sampling (estimate)
			Inches		*Pound per cubic foot*	*Percent*	*Percent*
Colbert silty clay loam:							
0.5 mile N. of Poplar Springs (modal profile).	Argillaceous limestone	S32911	0–5	A_2	91	29	
		S32912	5–18	B_2	83	32	
		S32913	18–31	B_3 or C_1	97	26	
0.75 mile SE. of Bellview Church (fine-textured, more firm profile).	Argillaceous limestone	S32908	1–6	A_2	107	19	
		S32909	6–15	B_2	88	31	
		S32910	15–23	C_1	90	28	
1.5 miles NE. of Philadelphia (darker colored profile).	Argillaceous limestone	S32914	0–4	A_p	101	22	
		S32915	4–12	B_1	89	30	
		S32916	16–24	B_3 or C_1	93	29	
Decatur silty clay loam:							
2 miles NE. of Philadelphia (modal profile).	Limestone	S32917	1–6	A_p	110	17	
		S32918	26–46	B_{23}	99	25	
		S32919	46–60	B_3	86	34	
1 mile NW. of Philadelphia (more friable profile).	Limestone	S32920	0–6	A_p	112	17	
		S32921	24–45	B_{22}	100	23	
		S32922	69–78	B_3	103	21	
2 miles E. of Greenback (high clay, firm subsoil).	Limestone	S32923	0–6	A_p	105	20	
		S32924	26–48	B_{23}	97	25	
		S32925	48–75	B_3	98	25	
Fullerton cherty silt loam:							
2 miles N. of Huff Ferry Crossing (modal profile).	Dolomitic limestone	S32929	1–8	A_2	116	12	6
		S32930	23–33	B_{22}	96	26	11
		S32931	46–69	C_1	97	25	14
2 miles E. of Pine Grove Church (finer textured B horizon).	Dolomitic limestone	S32932	2–8	A_2	106	17	
		S32933	34–50	B_{23}	105	21	8
		S32934	50–65	B_3 or C_1	100	23	10
1 mile S. of Loudon (coarse-textured profile).	Dolomitic limestone	S32926	1–6	A_2	107	16	
		S32927	22–45	B_{22}	95	26	5
		S32928	56–62	C_1	91	30	8
Landisburg silt loam:							
1.75 miles SE. of Corinth Church (modal profile).	Alluvium	S32935	1–6	A_2	106	16	
		S32936	9–18	B_2	117	14	
		S32937	25–42	C_1	116	14	
0.5 mile NW. of Steekee School (coarse-textured profile).	Alluvium	S32938	0–6	A_p	108	15	
		S32939	22–36	B_{22}	114	15	
		S32940	36–59	B_{3m}	111	17	
On Sugarlimb Road (finer textured profile).	Alluvium	S32941	1–7	A_2	109	16	
		S32942	18–27	B_2	114	15	
		S32943	38–48	C_m	110	18	
Talbott silty clay loam:							
1.5 miles E. of Centersville Store (modal profile).	Highly argillaceous limestone.	S32944	0–7	A_p	104	20	
		S32945	14–30	B_2	92	29	
		S32946	30–48	B_3 or C_1	91	30	
2 miles S. of Fork Creek School (fine-textured profile).	Highly argillaceous limestone.	S32947	0–6	A_p	104	20	
		S32948	12–21	B_2	91	30	
		S32949	30–45	C_1	90	30	
2 miles S. of Unitia (fine-textured profile).	Highly argillaceous limestone.	S32950	0–7	A_p	107	18	
		S32951	12–29	B_2	88	31	
		S32952	29–44	B_3 or C_1	90	31	
Tellico loam:							
2 miles SE. of Centersville Store (modal profile).	Calcareous sandstone	S32953	0–8	A_1	117	14	
		S32954	17–39	B_{21}	114	17	
		S32955	60–76	B_3 or C_1	105	21	

See footnotes at end of table.

test data

procedures of the American Association of State Highway Officials]

Mechanical analysis [1]—Continued															Liquid limit	Plasticity index	Classification	
Percentage passing sieve [2]—											Percentage smaller than [2]—							
3-inch	2-inch	1½-inch	1-inch	¾-inch	⅜-inch	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO [3]	Unified [4]
									100	98	97	93	80	69	77	42	A–7–5(20)	MH–CH.
							100	99	98	92	89	80	62	48	69	27	A–7–5(19)	MH.
		100	99	98	98	95	95	92	91	90	90	87	74	62	69	35	A–7–5(20)	MH–CH.
							100	98	96	92	89	68	42	30	33	11	A–6(8)	ML–CL.
									100	99	97	86	79	70	86	50	A–7–5(20)	MH–CH.
									100	99	97	88	78	70	80	45	A–7–5(20)	MH–CH.
							100	97	95	87	85	72	48	35	46	19	A–7–6(13)	ML–CL.
							100	99	98	93	92	88	74	66	80	44	A–7–5(20)	MH–CH.
									100	98	96	89	77	68	75	40	A–7–5(20)	MH–CH.
					100	99	97	91	87	78	76	61	35	23	32	11	A–6(8)	CL.
							100	97	95	89	87	79	65	57	62	35	A–7–6(20)	CH.
							100	99	98	96	96	91	83	78	83	40	A–7–5(20)	MH.
				100	99	97	95	92	88	79	77	71	46	38	36	18	A–6(11)	CL.
							100	98	95	87	86	79	63	58	55	25	A–7–5(17)	MH–CH.
							100	97	93	83	82	74	57	49	51	23	A–7–6(15)	MH–CH.
							100	98	97	92	90	78	52	43	41	19	A–7–6(12)	CL.
							100	99	98	95	93	87	70	64	57	25	A–7–5(17)	MH.
							100	99	98	94	93	84	68	61	57	28	A–7–6(19)	MH–CH.
94	93	92	92	91	89	86	81	74	68	56	54	41	21	11	22	5	A–4(5)	ML–CL.
89	88	86	85	84	81	79	76	74	71	67	66	62	54	49	70	35	A–7–5(20)	MH–CH.
86	85	83	81	80	78	76	73	67	63	58	57	52	46	41	71	38	A–7–5(18)	MH–CH.
	100	99	98	97	94	90	86	78	76	70	69	58	30	18	30	8	A–4(7)	ML–CL.
92	90	88	85	83	77	74	71	68	67	65	64	58	45	35	48	22	A–7–6(13)	ML–CL.
90	90	86	81	76	68	61	58	55	54	52	52	46	36	30	58	28	A–7–5(14)	MH–CH.
		100	99	99	97	94	88	78	73	62	59	48	28	15	25	5	A–4(5)	ML–CL.
95	93	90	88	86	82	79	75	71	70	68	67	65	56	48	64	33	A–7–5(19)	MH–CH.
92	92	91	89	87	82	80	77	75	74	73	73	70	64	57	78	42	A–7–5(20)	MH–CH.
		100	99	89	96	89	80	73	70	65	63	50	25	14	31	7	A–4(6)	ML–CL.
			100	99	96	90	83	77	74	70	66	54	28	18	28	9	A–4(7)	CL.
			100	99	97	93	84	77	75	70	68	54	29	18	31	11	A–6(7)	CL.
		100	99	99	97	95	93	86	81	71	69	52	25	15	27	5	A–4(7)	ML–CL.
		100	99	99	98	97	95	89	85	79	77	63	36	25	32	12	A–6(9)	CL.
							100	95	92	86	83	67	36	26	36	13	A–6(9)	ML–CL.
				100	99	95	88	86	75	70	68	55	30	17	28	5	A–4(7)	ML–CL.
					100	98	91	82	79	74	73	62	40	26	31	11	A–6(8)	CL.
							100	98	97	95	93	83	58	35	38	17	A–6(11)	CL.
							100	98	97	93	90	71	45	31	37	13	A–6(9)	ML–CL.
										100	98	87	74	64	74	41	A–7–5(20)	MH–CH.
										100	98	84	70	61	70	37	A–7–5(20)	MH–CH.
							100	99	98	95	91	68	46	35	37	13	A–6(9)	ML–CL.
									100	99	98	87	76	67	78	45	A–7–5(20)	CH.
									100	99	99	91	76	65	80	43	A–7–5(20)	MH–CH.
							100	97	95	89	84	64	40	27	33	11	A–6(8)	ML–CL.
									100	98	96	88	76	67	86	51	A–7–5(20)	CH.
										100	98	85	73	62	72	36	A–7–5(20)	MH.
								100	92	57	53	45	30	20	24	7	A–4(4)	ML–CL.
								100	94	72	69	60	46	37	36	16	A–6(10)	CL.
								100	97	73	71	65	55	49	51	24	A–7–6(15)	MH–CH.

TABLE 4.—*Engineering*

[Tests performed by the Bureau of Public Roads in accordance with standard

Soil name and location	Parent material	Bureau of Public Roads report No.	Depth	Horizon	Moisture-density		Mechanical analysis [1]
					Maximum dry density	Optimum moisture	Fragments more than 3 inches in size discarded in field sampling (estimate)
			Inches		*Pound per cubic foot*	*Percent*	*Percent*
Tellico loam—Continued							
500 feet E. of Loudon water reservoir (coarse-textured profile).	Calcareous sandstone	S32956	3–10	A_{12}	114	16	
		S32957	21–36	B_{21}	110	18	
		S32958	58–65	C_1	104	22	
0.5 mile W. of Meadow (fine-textured profile).	Calcareous sandstone	S32959	0–7	A_1	93	26	
		S32960	14–32	B_2	103	24	
		S32961	44–70	C_1	105	23	
Waynesboro loam:							
1 mile N. of Huff Ferry Crossing (modal profile).	Alluvium	S32962	1–7	A_2	120	12	
		S32963	27–37	B_{22}	94	28	
		S32964	45–60	C_1	99	24	
2 miles S. of Davis Ferry (coarse-textured profile).	Alluvium	S32965	0–7	A_p	122	12	
		S32966	26–38	B_{22}	108	19	
		S32967	46–60	C_1	115	15	
2 miles NE. of Jackson School (fine-textured profile).	Alluvium	S32968	1–7	A_2	119	12	
		S32969	29–39	B_{22}	106	21	
		S32970	54–72	C_1	101	23	

[1] Mechanical analyses according to the American Association of State Highway Officials Designation: T 88-54. Results by this procedure frequently differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses

test data—Continued

procedures of the American Association of State Highway Officials]

Mechanical analysis [1]—Continued																Liquid limit	Plasticity index	Classification	
Percentage passing sieve [2]—											Percentage smaller than [2]—								
3-inch	2-inch	1½ inch	1-inch	¾-inch	⅜-inch	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO [3]	Unified [4]
							100	97	93	59	55	43	29	23	27	8	A–4(5)	CL.
							100	98	96	70	65	55	42	36	38	18	A–6(10)	CL.
								100	99	76	70	61	52	45	50	23	A–7–6(15)	ML–CL.
							100	97	90	64	62	52	36	26	42	12	A–7–5(7)	ML.
							100	99	93	71	70	63	54	48	53	25	A–7–6(16)	MH–CH.
							100	99	93	70	68	65	55	47	52	23	A–7–6(14)	MH–CH.
				100	99	98	96	87	77	55	48	35	19	13	19	3	A–4(4)	ML.
100	97	94	93	92	91	91	90	86	82	71	68	63	57	53	68	29	A–7–5(18)	MH.
		100	98	97	95	94	92	86	81	71	68	60	51	46	66	31	A–7–5(19)	MH.
	100	98	96	95	91	87	83	71	64	46	42	32	20	13	23	7	A–4(2)	SM–SC.
		100	99	99	98	97	93	78	72	55	53	47	42	39	58	28	A–7–5(13)	MH–CH.
				100	99	98	94	75	67	47	42	36	29	27	48	23	A–7–6(7)	SC.
		100	98	97	95	93	90	81	74	55	50	37	20	13	20	5	A–4(4)	ML–CL.
		100	98	96	94	93	89	82	78	63	60	53	44	40	52	23	A–7–6(12)	MH–CH.
		100	98	97	95	94	91	84	80	65	62	54	46	41	56	23	A–7–5(14)	MH.

used in this table are not suitable for use in naming textural classes for soils.

[2] Based on total material. Laboratory test data corrected for amount discarded in field sampling.

[3] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (Pt. 1, Ed. 7): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AASHO Designation: M145–49.

[4] Based on the Unified Soil Classification System, Technical Memorandum No. 3–357, Vol. 1, Waterways Experiment Station, Corps of Engineers, March 1953.

Engineering Descriptions and Physical Properties

Table 5 gives, for each of the mapping units, some of the soil characteristics significant in engineering and the engineering classification of the soil materials in the principal horizons.

Depth to the seasonally high water table is based on field observations. Comparisons between depth to bedrock and depth to the water table reveal that in some cases the water table lies within the bedrock. This is possible in pervious sedimentary deposits and cavernous limestone.

Permeability is estimated for the uncompacted soil material. The estimates are based on structure and consistence and on field observations. A limited amount of laboratory data is available.

Made land, Quarry, and Rockland are not included in table 5. They consist of areas that have been leveled or

TABLE 5.—*Brief description of soils*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	Classification	
						USDA textural class	Unified
		Feet	*Feet*		*Inches*		
	Alcoa loam	10 or more	5.0 to 25.0	Well-drained soils developed in old colluvium on foot slopes and benches. Parent material and bedrock are calcareous sandstone and sandy shale.	0 to 10	Loam	ML or CL
AcB	Gently sloping phase.				10 to 44	Clay loam	ML or CL
AcC	Sloping phase.				44 to 60	Clay	MH or CH
Ba	Barbourville silt loam.	1.0 to 5.0	2.0 to 10.0	Well-drained soil consisting of recent colluvium or local alluvium. Occurs along intermittent drainageways and on toe slopes. Parent material and bedrock are shale.	0 to 36	Silt loam	ML or CL
					36 to 48	Silt loam to silty clay loam.	ML or CL
	Bland silty clay loam.	20 or more	0.0 to 2.0	Well-drained shallow soils on uplands. Developed in residual materials from red shaly limestone or calcareous mudstone. Bedrock outcrops are common.	0 to 6	Silty clay loam	ML or CL
BnC	Sloping phase.				6 to 20	Silty clay to clay	MH or CH
BnD	Moderately steep phase.						
	Bolton silt loam	20 or more	5.0 to 25.0	Well-drained soils on hilly to steep uplands. Developed in residuum from sandy dolomitic limestone.	0 to 7	Silt loam	ML or CL
BoC2	Eroded sloping phase.				7 to 60	Silty clay loam	ML or CL
BoD2	Eroded moderately steep phase.				60 to 80	Cherty clay	MH or CH
BoE2	Eroded steep phase.						
	Clarksville cherty silt loam.	20 or more	5.0 to 40.0	Well drained to excessively drained cherty soils on rolling to very steep uplands. Developed in residuum from cherty dolomitic limestone. Chert fragments range up to 5 inches in diameter.	0 to 12	Cherty silt loam	SM or SC
CaC	Sloping phase.				12 to 50	Cherty clay loam	GM or GC
CaD	Moderately steep phase.				50 to 65	Cherty loam	GM or GC
CaE	Steep phase.						
CaF	Very steep phase.						
CbC	Colbert silty clay loam, sloping phase.	10 or more	0.0 to 2.0	Well drained and moderately well drained, fine-textured soil. Shallow over argillaceous limestone parent rock. Bedrock outcrops common. Occurs on low rolling hills.	0 to 8	Silty clay loam	MH or CH
					8 to 21	Clay	MH or CH
	Congaree loam	2.0 to 5.0	5.0 to 20.0	Well-drained soils of first bottoms. Consist of alluvium from micaceous rock, granite, slate, and schist.	0 to 60	Loam	ML, CL, or SM.
CoA	Nearly level phase.						
CoC	Sloping phase.						

filled for commercial purposes, quarry pits, and spoil areas, or land that contains many limestone outcrops.

Available water, in inches per foot of soil depth, is an approximation of the capillary water when the soil is wet to field capacity. It is the amount of water held in the soil between 1/3 and 15 atmospheres tension. If the soil is at permanent wilting point, this amount of water will wet it to a depth of 1 foot. Laboratory data are available for a few of the soils in Loudon County; for the others, estimates are based on data for similar soils.

Dispersion refers to the degree to which and the rate at which the aggregates disintegrate when saturated with water. This property is estimated on the basis of soil structure and texture.

The shrink-swell potential is an indication of the volume change to be expected with a change in moisture content. It is estimated primarily on the basis of the amount and type of clay.

and their estimated physical properties

Classification—Con.	Percentage passing—			Selected characteristics significant in engineering					
AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Permeability	Structure	Available water	pH	Dispersion	Shrink-swell potential
				Inches per hour		*Inches per foot of depth*			
A–4 or A–6	50 to 65	90 to 100	95 to 100	0.8 to 2.5	Granular	2.4 to 3.0	5.1 to 6.0	High	Moderate.
A–6 or A–7	55 to 70	90 to 100	95 to 100	0.8 to 2.5	Blocky	1.8 to 2.4	5.1 to 5.5	Moderate	High.
A–6 or A–7	65 to 75	90 to 100	95 to 100	0.8 to 2.5	Blocky	1.8 to 2.4	5.1 to 5.5	Low to moderate.	High.
A–4	75 to 90	85 to 95	90 to 100	0.8 to 2.5	Granular	2.4 to 3.0	5.1 to 6.0	High	Moderate.
A–4 or A–6	80 to 95	90 to 100	95 to 100	0.8 to 2.5	Granular	1.8 to 3.0	5.1 to 6.0	Moderate	Moderate.
A–6	90 to 100	95 to 100	95 to 100	0.2 to 0.8	Granular	1.2 to 1.8	6.1 to 6.5	Low	Moderate.
A–6 or A–7	85 to 95	90 to 100	95 to 100	0.2 to 0.8	Blocky	1.2 to 1.8	6.1 to 6.5	Low	High.
A–4 or A–6	70 to 85	85 to 95	90 to 100	0.8 to 2.5	Granular	2.4 to 3.0	5.6 to 6.0	High	Moderate.
A–6	75 to 90	90 to 100	95 to 100	0.8 to 2.5	Blocky	1.2 to 2.4	5.1 to 5.5	Moderate	High.
A–6 or A–7	65 to 80	70 to 85	75 to 90	0.8 to 2.5	Massive	1.2 to 1.8	5.1 to 5.5	Low	High.
A–2 or A–4	35 to 50	45 to 65	55 to 75	0.8 to 2.5	Granular	0.2 to 1.8	4.5 to 5.0	High	Moderate.
A–2 or A–4	25 to 40	30 to 45	35 to 50	0.8 to 2.5	Blocky	0.6 to 1.2	4.5 to 5.0	Moderate	Moderate.
A–2 or A–4	20 to 35	25 to 40	30 to 45	0.8 to 2.5	Massive	0.6 to 1.2	4.5 to 5.0	High	Moderate.
A–7	90 to 100	95 to 100	95 to 100	0.2 to 0.8	Granular	1.2 to 1.8	5.6 to 6.0	Low	High.
A–7	95 to 100	95 to 100	95 to 100	<0.2	Blocky	1.2 to 1.8	5.6 to 6.0	Low	Very high.
A–4	40 to 60	90 to 100	95 to 100	2.5 to 5.0	Granular	2.4 to 3.0	6.1 to 7.3	High	Low.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	Classification	
						USDA textural class	Unified
		Feet	*Feet*		*Inches*		
	Cumberland silty clay loam.	20 or more	5.0 to 20.0	Well-drained soils on high stream terraces. Rolling to hilly. Developed in general alluvium. Bedrock is chiefly limestone.	0 to 12	Silty clay loam	CL
					12 to 70	Clay	MH or CH
CmB2	Eroded gently sloping phase.						
CmC2	Eroded sloping phase.						
CmC3	Severely eroded sloping phase.						
CmD2	Eroded moderately steep phase.						
CmD3	Severely eroded moderately steep phase.						
CmE2	Eroded steep phase.						
	Cumberland gravelly clay loam.	20 or more	5.0 to 20.0	Well-drained soils on old or high terraces. Developed in alluvium mainly from limestone. Pebbles and cobbles on and in the soil. Bedrock is limestone.	0 to 8	Gravelly clay loam	ML or CL
					8 to 60	Gravelly clay to sandy clay.	MH or CH
CuC2	Eroded sloping phase.						
CuD2	Eroded moderately steep phase.						
CrE3	Cumberland and Decatur silty clay loams, severely eroded steep phases.	20 or more	3.0 to 20.0	Well-drained upland or terrace soils developed in dolomitic limestone residuum and in alluvium from limestone. Bedrock is limestone.	0 to 7	Silty clay loam	CL
					7 to 60	Clay	MH or CH
	Decatur silty clay loam.	20 or more	5.0 to 20.0	Well-drained soils developed in residuum from dolomitic limestone. Occur on rolling to hilly uplands. Bedrock is dolomitic limestone.	0 to 7	Silt loam to silty clay.	CL
DcB2	Eroded gently sloping phase.				7 to 60	Clay	MH or CH
DcC2	Eroded sloping phase.						
DcC3	Severely eroded sloping phase.						
DcD2	Eroded moderately steep phase.						
DcD3	Decatur silty clay, severely eroded moderately steep phase.	20 or more	3.0 to 12.0	Well-drained soil developed in residuum from dolomitic limestone. Occurs on rolling to hilly uplands. Bedrock is dolomitic limestone.	0 to 7	Silt loam to silty clay.	CL
					7 to 60	Clay	MH or CH
	Dewey silty clay loam.	20 or more	5.0 to 20.0	Well-drained soils developed in residuum from dolomitic limestone. Occur on rolling to steep uplands. Bedrock is dolomitic limestone.	0 to 11	Silt loam to silty clay.	ML or CL
DeB2	Eroded gently sloping phase.				11 to 60	Clay	CL
DeC2	Eroded sloping phase.						
DeD2	Eroded moderately steep phase.						
DeE2	Eroded steep phase.						
	Dewey silty clay	20 or more	7.0 to 20.0	Well-drained soils developed in residuum from dolomitic limestone. Occur on rolling to steep uplands. Bedrock is dolomitic limestone.	0 to 11	Silt loam to silty clay.	ML or CL
DwC3	Severely eroded sloping phase.				11 to 60	Clay	CL
DwD3	Severely eroded moderately steep phase.						
DwE3	Severely eroded steep phase.						

estimated physical properties—Continued

Classification—Con.	Percentage passing—			Selected characteristics significant in engineering					
AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Permeability	Structure	Available water	pH	Dispersion	Shrink-swell potential
				Inches per hour		*Inches per foot of depth*			
A–6 or A–7	65 to 75	90 to 100	95 to 100	0.8 to 2.5	Granular	1.8 to 2.4	5.6 to 6.0	Moderate	Moderate.
A–7	75 to 87	90 to 100	95 to 100	0.8 to 2.5	Blocky	1.8 to 2.4	5.1 to 5.5	Low	High.
A–4	60 to 80	70 to 90	70 to 90	0.8 to 2.5	Granular	1.2 to 1.8	5.1 to 6.0	Moderate	Moderate.
A–7	50 to 75	55 to 75	60 to 80	0.8 to 2.5	Blocky	0.6 to 1.2	5.1 to 5.5	Low	High.
A–6 or A–7	75 to 95	90 to 100	95 to 100	0.8 to 2.5	Granular	1.8 to 2.4	5.6 to 6.0	Moderate	High.
A–7	80 to 95	90 to 100	95 to 100	0.8 to 2.5	Blocky	1.2 to 1.8	5.1 to 5.5	Low	High.
A–6 or A–7	70 to 92	90 to 100	95 to 100	0.8 to 2.5	Granular	1.8 to 2.4	5.6 to 6.0	Moderate	Moderate.
A–7	80 to 95	90 to 100	95 to 100	0.8 to 2.5	Blocky	1.2 to 2.4	5.1 to 5.5	Low	High.
A–6 or A–7	70 to 92	90 to 100	95 to 100	0.8 to 2.5	Granular	1.8 to 2.4	5.6 to 6.0	Moderate	Moderate.
A–7	80 to 95	90 to 100	95 to 100	0.8 to 2.5	Blocky	1.2 to 2.4	5.1 to 5.5	Low	High.
A–6	65 to 75	85 to 95	90 to 95	0.8 to 2.5	Granular	1.8 to 2.4	5.1 to 6.0	Moderate	Moderate.
A–6 or A–7	65 to 85	85 to 100	90 to 100	0.8 to 2.5	Blocky	1.2 to 2.4	5.1 to 5.5	Low	High.
A–7	65 to 75	85 to 95	90 to 95	0.8 to 2.5	Granular	1.8 to 2.4	5.1 to 6.0	Moderate	Moderate.
A–6 or A–7	65 to 85	85 to 100	90 to 100	0.8 to 2.5	Blocky	1.2 to 2.4	5.1 to 5.5	Low	High.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	Classification	
						USDA textural class	Unified
		Feet	*Feet*		*Inches*		
Em	Emory silt loam	1.0 to 3.0	5.0 to 20.0	Well-drained soil consisting of colluvium or local alluvium. Occurs along drainageways, in depressions, and at base of slopes. Parent material is from dolomitic limestone. Underlain by limestone.	0 to 40	Silt loam to silty clay loam.	ML or CL
Er	Emory silty clay loam.	1.0 to 3.0	5.0 to 20.0	Well-drained soil consisting of colluvium or local alluvium. Occurs along drainageways, in depressions, and at base of slopes. Parent material is from dolomitic limestone. Underlain by limestone.	0 to 40	Silt loam to silty clay loam.	ML or CL
	Etowah silt loam	20 or more	5.0 to 20.0	Well-drained soils on terraces. Developed in alluvium, mainly from limestone. Bedrock is usually limestone.	0 to 8	Silt loam	ML or CL
EtB	Gently sloping phase.				8 to 60	Silty clay loam	CL
EtC2	Eroded sloping phase.						
EtD2	Eroded moderately steep phase.						
	Farragut silty clay loam.	20 or more	2.5 to 6.0	Well-drained soils on rolling to steep uplands. Developed in residuum from limestone containing lenses of shale. Bedrock is limestone or limestone and shale.	0 to 7	Silty clay loam to silty clay.	CL
FaB2	Eroded gently sloping phase.				7 to 54	Silty clay to clay	MH or CH
FaC2	Eroded sloping phase.						
FaD2	Eroded moderately steep phase.						
	Farragut silty clay	20 or more	2.5 to 6.0	Well-drained soils on rolling to steep uplands. Developed in residuum from limestone containing lenses of shale. Bedrock is limestone or limestone and shale.	0 to 7	Silty clay loam to silty clay.	CL
FbC3	Severely eroded sloping phase.				7 to 54	Silty clay to clay	MH or CH
FbD3	Severely eroded moderately steep phase.						
FbE3	Severely eroded steep phase.						
	Fullerton cherty silt loam.	20 or more	5.0 to 40.0	Well-drained cherty soils on rolling to very steep uplands. Developed in residuum from cherty dolomitic limestone. Chert fragments throughout the soil, mainly less than 4 inches in diameter. Bedrock is cherty dolomitic limestone.	0 to 14	Cherty silt loam to cherty silty clay loam.	ML or CL
FcC	Sloping phase.				14 to 25	Cherty silty clay loam.	MH or CH
FcD	Moderately steep phase.				25 to 70	Cherty clay	MH or CH
FcE	Steep phase.						
FcF	Very steep phase.						
	Fullerton cherty silty clay loam.	20 or more	5.0 to 40.0	Well-drained cherty soils on rolling to very steep uplands. Developed in residuum from cherty dolomitic limestone. Chert fragments throughout the soil, mainly less than 4 inches in diameter. Bedrock is cherty dolomitic limestone.	0 to 14	Cherty silt loam to cherty silty clay loam.	ML or CL
FdD3	Severely ercded moderately steep phase.				14 to 25	Cherty silty clay loam.	MH or CH
FdE3	Severely eroded steep phase.				25 to 70	Cherty clay	MH or CH
FdF3	Severely eroded very steep phase.						

estimated physical properties—Continued

Classification—Con.	Percentage passing—			Selected characteristics significant in engineering					
AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Permeability	Structure	Available water	pH	Dispersion	Shrink-swell potential
				Inches per hour		*Inches per foot of depth*			
A–6 or A–7	75 to 95	90 to 95	95 to 100	0.8 to 2.5	Granular	1.8 to 3.0	5.1 to 6.0	Moderate	Moderate.
A–6 or A–7	75 to 95	90 to 95	95 to 100	0.8 to 2.5	Granular	1.8 to 3.0	5.1 to 6.0	Moderate	Moderate.
A–6	70 to 85	85 to 95	90 to 100	0.8 to 2.5	Granular	1.8 to 3.0	5.6 to 6.0	Moderate to high.	Moderate.
A–6 or A–7	70 to 85	85 to 95	90 to 100	0.8 to 2.5	Blocky	1.8 to 2.4	5.1 to 5.5	Moderate	High.
A–6	70 to 85	90 to 100	95 to 100	0.8 to 2.5	Granular	1.8 to 2.4	5.1 to 6.0	Moderate	High.
A–7	80 to 95	95 to 100	95 to 100	0.2 to 0.8	Blocky	1.2 to 1.8	5.1 to 5.5	Low	High.
A–6	70 to 85	90 to 100	95 to 100	0.8 to 2.5	Granular	1.8 to 2.4	5.1 to 6.0	Moderate	High.
A–7	80 to 95	95 to 100	95 to 100	0.2 to 0.8	Blocky	1.2 to 1.8	5.1 to 5.5	Low	High.
A–4	55 to 75	65 to 85	70 to 90	0.8 to 2.5	Granular	1.2 to 1.8	4.5 to 5.0	Moderate to high.	Moderate.
A–6 or A–7	60 to 75	65 to 80	70 to 85	0.2 to 0.8	Blocky	1.2 to 1.8	4.5 to 5.0	Moderate	High.
A–7	50 to 75	55 to 75	60 to 80	0.2 to 0.8	Blocky	0.6 to 1.2	4.5 to 5.0	Low	High.
A–4	55 to 75	65 to 85	70 to 90	0.8 to 2.5	Granular	1.2 to 1.8	4.5 to 5.0	Moderate to high.	Moderate.
A–6	60 to 75	65 to 80	70 to 85	0.2 to 0.8	Blocky	1.2 to 1.8	4.5 to 5.0	Moderate	High.
A–7	50 to 75	55 to 75	60 to 80	0.2 to 0.8	Blocky	0.6 to 1.2	4.5 to 5.0	Low	High.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	Classification	
						USDA textural class	Unified
		Feet	*Feet*		*Inches*		
	Fullerton silt loam	20 or more	3.5 to 25.0	Well-drained soils on rolling to steep uplands. Developed in residuum from dolomitic limestone. Small amounts of fine chert fragments, mainly in lower horizons. Bedrock is dolomitic limestone.	0 to 14	Silt loam to silty clay loam.	ML or CL
FsB	Gently sloping phase.				14 to 18	Silty clay loam	CL
FsC	Sloping phase.				18 to 65	Clay	MH or CH
FsD	Moderately steep phase.						
FsE	Steep phase.						
FsF	Very steep phase.						
	Fullerton silty clay loam.	20 or more	3.5 to 25.0	Well-drained soils on rolling to steep uplands. Developed in residuum from dolomitic limestone. Small amounts of fine chert fragments, mainly in lower horizons. Bedrock is dolomitic limestone.	0 to 14	Silt loam to silty clay loam.	ML or CL
FtC3	Severely eroded sloping phase.				14 to 18	Silty clay loam	CL
FtD3	Severely eroded moderately steep phase.				18 to 65	Clay	MH or CH
FtE3	Severely eroded steep phase.						
Ge	Greendale silt loam	0	4.0 to 12.0	Well-drained soil consisting of recent colluvium or local alluvium deposited along drainageways, in depressions, and at the base of slopes. Parent material is from limestone soils. Bedrock is limestone. May be a few fine chert fragments.	0 to 12	Silt loam	ML or CL
					12 to 48	Silt loam to silty clay loam.	ML or CL
Gc	Greendale cherty silt loam.	0	4.0 to 12.0	Well-drained cherty soil consisting of recent colluvium or local alluvium. Occurs along drainageways, in depressions, and on toe slopes. Parent material from cherty dolomitic limestone soils.	0 to 12	Cherty silt loam	ML or CL
					12 to 48	Cherty silt loam to cherty silty clay loam.	ML or CL
Gl	Gullied land, limestone materials.	20 or more	0.0 to 30.0	Consists of network of shallow and deep gullies. Fine-textured soil material developed from limestone. Limestone outcrops in some areas.		Clay to cherty clay.	CH
Gs	Gullied land, shale materials.	20 or more	0.0 to 2.0	Consists of network of shallow gullies. Soil material is shaly and very shallow over shale bedrock. Bedrock is at or near the surface in most places.		Shaly silt loam to shaly silty clay.	ML or CL
	Hermitage silt loam	10 or more	5.0 to 12.0	Well-drained soils developed in colluvium or local alluvium from dolomitic limestone. Bedrock is limestone.	0 to 8	Silt loam	ML or CL
HeB	Gently sloping phase.				8 to 54	Silty clay loam	CL
HeC2	Eroded sloping phase						

estimated physical properties—Continued

Classification—Con.	Percentage passing—			Selected characteristics significant in engineering					
AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Permeability	Structure	Available water	pH	Dispersion	Shrink-swell potential
				Inches per hour		*Inches per foot of depth*			
A–4 or A–6	75 to 85	80 to 90	85 to 95	0.8 to 2.5	Granular	1.8 to 3.0	4.5 to 5.0	Moderate to high.	Moderate.
A–6	75 to 85	80 to 90	85 to 95	0.2 to 0.8	Blocky	1.8 to 2.4	4.5 to 5.0	Moderate	High.
A–7	80 to 95	80 to 100	80 to 100	0.2 to 0.8	Blocky	1.2 to 1.8	4.5 to 5.0	Low	High.
A–4	75 to 85	80 to 90	85 to 95	0.8 to 2.5	Granular	1.8 to 3.0	4.5 to 5.0	Moderate to high.	Moderate.
A–6	75 to 85	80 to 90	85 to 95	0.2 to 0.8	Blocky	1.8 to 2.4	4.5 to 5.0	Moderate	High.
A–7	80 to 95	80 to 100	80 to 100	0.2 to 0.8	Blocky	1.2 to 1.8	4.5 to 5.0	Low	High.
A–4	80 to 95	85 to 100	90 to 100	0.8 to 2.5	Granular	2.4 to 3.0	5.6 to 6.0	High	Moderate.
A–6	80 to 95	85 to 100	90 to 100	0.8 to 2.5	Granular	1.8 to 2.4	5.6 to 6.0	Moderate	Moderate.
A–4	50 to 70	60 to 80	70 to 90	0.8 to 2.5	Granular	1.8 to 2.4	5.6 to 6.0	High	Moderate.
A–6	50 to 70	60 to 80	70 to 90	0.8 to 2.5	Granular	1.2 to 1.8	5.6 to 6.0	Moderate	Moderate.
A–7	60 to 100	65 to 100	70 to 100	<0.2	Blocky to massive.	0.3 to 1.8	4.5 to 5.5	Low	High.
A–4, A–6, or A–7.	25 to 40	35 to 50	50 to 70	<0.2	Blocky to massive.	0.3 to 1.2	4.5 to 5.0	Low	Moderate.
A–4	70 to 85	85 to 95	90 to 100	0.8 to 2.5	Granular	1.8 to 2.4	5.6 to 6.0	Moderate to high.	Moderate.
A–6	70 to 85	85 to 95	90 to 100	0.8 to 2.5	Blocky	1.8 to 2.4	5.1 to 5.5	Moderate	High.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	Classification	
						USDA textural class	Unified
		Feet	*Feet*		*Inches*		
HcC	Hermitage cherty silt loam, sloping phase.	10 or more	5.0 to 12.0	Well-drained cherty soil developed in colluvium or local alluvium from dolomitic limestone. Occurs on benches and foot slopes below Dewey and Decatur soils. Underlain by dolomitic limestone. Chert fragments are mainly less than 3 inches in diameter.	0 to 8	Cherty silt loam	ML or CL
					8 to 54	Cherty silty clay loam.	CL
HnA	Huntington loam Nearly level phase.	0	5.0 to 20.0	Well-drained young alluvial soils on first bottoms. Alluvium derived principally from limestone. Some soils are subject to flooding.	0 to 60	Loam to silt loam	ML or CL
HnC	Sloping phase.						
	Landisburg silt loam	1.5 to 2.5	5.0 to 15.0	Moderately well drained to imperfectly drained soils on foot slopes. Developed in colluvium or local alluvium derived from cherty dolomitic limestone. Profile has weak to moderate fragipan at 2 feet. Seasonally perched water table. Underlain by limestone.	0 to 12	Silt loam	ML or CL
LdB	Gently sloping phase.				12 to 25	Silty clay loam	CL
LdC2	Eroded sloping phase.				25 to 35	Silty clay loam to silt loam.	CL
					36 to 48	Silty clay to cherty silty clay.	CL
LcB	Landisburg cherty silt loam, gently sloping phase.	1.5 to 2.5	5.0 to 15.0	Moderately well drained to imperfectly drained soil on foot slopes. Developed in colluvium or local alluvium derived from cherty dolomitic limestone. Profile has weak to moderate fragipan at 2 feet. Seasonally perched water table. Bedrock is limestone.	0 to 12	Cherty silt loam	ML or CL
					12 to 25	Cherty silty clay loam.	CL
					25 to 36	Cherty silty clay loam to cherty silt loam.	CL
					36 to 48	Cherty silty clay	CL
LeB	Leadvale silt loam, gently sloping phase.	1.5 to 2.5	2.5 to 5.0	Moderately well drained to imperfectly drained soil on foot slopes. Developed in colluvium or local alluvium from shale. Seasonally perched water table. Underlain by shale bedrock.	0 to 8	Silt loam	ML or CL
					8 to 22	Silty clay loam	CL or CH
					22 to 48	Silty clay loam	MH or CH
	Lehew loam	20 or more	0.0 to 2.0	Excessively drained, shallow soils on steep ridges. Underlain by interbedded shale and sandstone bedrock.	0 to 7	Loam	SM or SC
LhD	Moderately steep phase.				7 to 20	Loam	SM or SC
LhE	Steep phase.						
LhF	Very steep phase.						
Ln and Ha	Lindside silt loam	0	5.0 to 30.0	Moderately well drained to imperfectly drained soil on first bottoms. Consists of recent alluvium derived chiefly from shale and limestone. Subject to flooding. Underlain chiefly by limestone.	0 to 25	Silt loam	ML or CL
					25 to 48	Silt loam to silty clay loam.	ML or CL

estimated physical properties—Continued

Classification—Con.	Percentage passing—			Selected characteristics significant in engineering					
AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Permeability	Structure	Available water	pH	Dispersion	Shrink-swell potential
				Inches per hour		*Inches per foot of depth*			
A–4	60 to 75	70 to 90	70 to 95	0.8 to 2.5	Granular	1.2 to 1.8	5.6 to 6.0	Moderate to high.	Moderate.
A–6	60 to 75	70 to 90	70 to 90	0.8 to 2.5	Blocky	1.2 to 1.8	5.1 to 5.5	Moderate	Moderate.
A–4 or A–6	45 to 65	90 to 100	95 to 100	0.8 to 2.5	Granular	2.4 to 3.0	6.1 to 7.3	Moderate to high.	Moderate.
A–4	60 to 75	80 to 95	85 to 95	0.8 to 2.5	Granular	1.8 to 2.4	4.5 to 5.5	High	Moderate.
A–6	70 to 85	80 to 95	90 to 100	0.2 to 0.8	Blocky	1.8 to 2.4	4.5 to 5.0	Moderate	High.
A–6	65 to 95	80 to 100	90 to 100	<0.2	Massive	1.2 to 1.8	4.5 to 5.0	Moderate	High.
A–6	65 to 95	75 to 100	85 to 100	0.2 to 0.8	Massive	1.2 to 1.8	4.5 to 5.0	Low	High.
A–4	50 to 70	60 to 80	70 to 90	0.8 to 2.5	Granular	1.2 to 1.8	4.5 to 5.5	High	Moderate.
A–6	55 to 75	65 to 85	75 to 95	0.2 to 0.8	Blocky	1.2 to 1.8	4.5 to 5.0	Moderate	High.
A–6	50 to 70	60 to 80	70 to 90	<0.2	Massive	0.6 to 1.2	4.5 to 5.0	Moderate	Moderate.
A–6	50 to 75	55 to 75	60 to 80	0.2 to 0.8	Massive	0.6 to 1.2	4.5 to 5.0	Low	High.
A–4 or A–6	80 to 95	90 to 100	95 to 100	0.8 to 2.5	Granular	1.8 to 2.4	5.1 to 5.5	Moderate	Moderate.
A–4, A–6, or A–7.	85 to 100	90 to 100	95 to 100	0.2 to 0.8	Blocky	1.2 to 1.8	4.5 to 5.0	Moderate	High.
A–7	80 to 100	90 to 100	95 to 100	<0.2	Massive	0.6 to 1.2	4.5 to 5.0	Moderate	High.
A–4	35 to 45	85 to 100	90 to 100	0.8 to 2.5	Granular	1.8 to 2.4	4.5 to 5.0	High	Low.
A–4	30 to 45	80 to 100	85 to 100	0.8 to 2.5	Granular	1.2 to 1.8	4.5 to 5.0	High	Low.
A–6	80 to 95	90 to 100	95 to 100	0.8 to 2.5	Granular	1.8 to 2.4	6.1 to 7.3	Moderate	Moderate.
A–6	80 to 95	90 to 100	95 to 100	0.2 to 0.8	Massive	1.8 to 2.4	6.1 to 7.3	Moderate	Moderate.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	Classification	
						USDA textural class	Unified
		Feet	*Feet*		*Inches*		
Lo and Hb	Lindside silt loam, local alluvium phase.	0	5.0 to 30.0	Moderately well drained to imperfectly drained soil on first bottoms. Consists of recent alluvium derived chiefly from shale and limestone. Subject to flooding. Underlain chiefly by limestone.	0 to 25 25 to 48	Silt loam Silt loam to silty clay loam.	ML or CL ML or CL
LtC LtD LtE	Litz silt loam Sloping phase. Moderately steep phase. Steep phase.	20 or more	1.0 to 1.5	Well-drained shallow soils on rolling to steep uplands. Developed in residuum from acid shale. Bedrock is acid shale.	0 to 7 7 to 16	Silt loam Silty clay to shaly silty clay.	ML or CL CL, MH, or CH.
LsC LsD LsE	Litz shaly silty clay loam. Sloping phase. Moderately steep phase. Steep phase.	20 or more	0.0 to 1.0	Well-drained shallow soils on rolling to steep uplands. Developed in residuum from acid shale. Shale fragments on surface and in soils. Bedrock is acid shale.	0 to 18	Shaly silty clay loam.	CL, MH, or CH.
Lu	Lobelville cherty silt loam.	0	5.0 to 25.0	Moderately well drained to imperfectly drained cherty soil on first bottoms. Consists of recent alluvium derived from cherty dolomitic limestone. Bedrock is limestone. Subject to flooding. Chert fragments range from 1 to 3 inches in diameter.	0 to 24 24 to 36	Cherty silt loam Cherty loam	ML or CL ML or CL
Me	Melvin silt loam	0	5.0 to 25.0	Poorly drained soil on first bottoms. Consists of alluvium derived chiefly from limestone. Subject to flooding. Underlain by limestone.	0 to 7 7 to 30	Silt loam Silt loam to silty clay loam.	CL CL
MsB MsC2	Minvale silt loam Gently sloping phase. Eroded sloping phase.	10 or more	5.0 to 30.0	Well-drained soils developed in colluvium derived from cherty limestone. Occur on foot slopes and benches below Fullerton and Clarksville soils. Underlain by limestone.	0 to 11 11 to 35 35 to 48	Silt loam Silty clay loam Silty clay loam to silty clay.	ML or CL CL CL
MrC2	Minvale cherty silt loam, eroded sloping phase.	10 or more	5.0 to 20.0	Well-drained cherty soil developed in colluvium derived from cherty dolomitic limestone. Occurs on foot slopes and benches below Fullerton and Clarksville soils. Chert fragments range up to 3 inches in diameter. Underlain by limestone.	0 to 11 11 to 35 35 to 48	Cherty silt loam Cherty silty clay loam. Cherty silty clay loam to cherty silty clay.	ML or CL CL CL
Ne	Neubert loam	0	3.0 to 12.0	Well-drained, young colluvial or local alluvial soil. Occurs along drainageways and at base of slopes. Consists of sediments derived from calcareous sandstone. Underlain by calcareous sandstone.	0 to 36	Loam	ML or CL

estimated physical properties—Continued

Classification—Con.	Percentage passing—			Selected characteristics significant in engineering					
AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Permeability	Structure	Available water	pH	Dispersion	Shrink-swell potential
				Inches per hour		*Inches per foot of depth*			
A–6	80 to 95	90 to 100	95 to 100	0.8 to 2.5	Granular	1.8 to 2.4	6.1 to 7.3	Moderate	Moderate.
A–6	80 to 95	90 to 100	95 to 100	0.2 to 0.8	Massive	1.8 to 2.4	6.1 to 7.3	Moderate	Moderate.
A–4 or A–6	80 to 90	85 to 90	90 to 95	0.8 to 2.5	Granular	1.8 to 2.4	5.1 to 5.5	Moderate	Moderate.
A–6 or A–7	70 to 85	75 to 85	80 to 85	0.2 to 0.8	Blocky	1.2 to 1.8	5.1 to 5.5	Moderate	High.
A–4 or A–6	60 to 80	65 to 85	70 to 85	0.2 to 0.8		0.6 to 1.2	5.1 to 5.5	Moderate	Moderate.
A–4	50 to 70	60 to 80	70 to 90	0.8 to 2.5	Granular	1.2 to 1.8	5.1 to 6.0	High	Low.
A–4	50 to 70	60 to 80	70 to 90	0.2 to 0.8	Massive	1.2 to 1.8	5.1 to 6.1	High	Low.
A–6	90 to 100	95 to 100	95 to 100	0.8 to 2.5	Granular	1.8 to 2.4	6.1 to 7.3	Moderate	Moderate.
A–6	85 to 100	95 to 100	95 to 100	0.2 to 0.8	Massive	1.8 to 2.4	6.1 to 7.3	Moderate to low.	High.
A–4	55 to 75	70 to 95	80 to 100	0.8 to 2.5	Granular	2.4 to 3.0	5.1 to 6.0	High	Moderate.
A–6	70 to 90	85 to 100	85 to 100	0.8 to 2.5	Blocky	1.8 to 2.4	4.5 to 5.5	Moderate	High.
A–6 or A–7	65 to 95	80 to 100	85 to 100	0.8 to 2.5		1.2 to 1.8	4.5 to 5.5	Moderate	High.
A–4	55 to 75	65 to 85	70 to 90	0.8 to 2.5	Granular	1.2 to 2.4	5.1 to 6.0	High	Moderate.
A–6	60 to 75	65 to 80	70 to 85	0.8 to 2.5	Blocky	1.2 to 2.4	4.5 to 5.5	Moderate	High.
A–6 or A–7	60 to 75	65 to 80	70 to 85	0.8 to 2.5	Blocky	1.2 to 1.8	4.5 to 5.5	Moderate	High.
A–4	55 to 65	90 to 100	95 to 100	2.5 to 5.0	Granular	2.4 to 3.0	5.6 to 6.0	High	Moderate.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	Classification	
						USDA textural class	Unified
		Feet	*Feet*		*Inches*		
NoC NoD2	Nolichucky gravelly fine sandy loam. Sloping phase. Eroded moderately steep phase.	20 or more	5.0 to 35.0	Well-drained gravelly soils on high terraces. Developed in coarse-textured alluvial deposits. Pebbles range up to 3 inches in diameter. Underlain by limestone.	0 to 12 12 to 24 24 to 50	Gravelly fine sandy loam. Gravelly sandy clay loam. Gravelly sandy clay.	ML or CL CL CL
Rb	Robertsville silt loam.	0		Poorly drained, fine-textured soil on terraces. Developed in alluvium derived chiefly from limestone. Nearly level to slightly depressed topography. Bedrock is usually limestone.	0 to 8 8 to 16 16 to 36	Silt loam Silty clay loam Silty clay to clay	ML or CL CL CL, MH, or CH.
SaB	Sequatchie fine sandy loam, gently sloping phase.	2.0 to 5.0	8.0 to 25.0	Well-drained, coarse-textured soil on second bottoms or low terraces. Developed in mixed alluvium. Underlain by limestone.	0 to 11 11 to 40	Fine sandy loam Sandy clay loam	ML or CL ML or CL
ScB ScC	Sequatchie loam Gently sloping phase. Sloping phase.	2.0 to 5.0	8.0 to 25.0	Well-drained soils on second bottoms or low terraces. Developed in mixed alluvium. Underlain mainly by limestone.	0 to 12 12 to 38	Loam Clay loam	ML or CL ML or CL
SkB2 SkC2 SkD2	Sequoia silty clay loam. Eroded gently sloping phase. Eroded sloping phase. Eroded moderately steep phase.	20 or more	1.5 to 3.5	Well-drained soils on undulating to hilly uplands. Developed in residuum from shale, Bedrock is soft shale.	0 to 12 12 to 26	Silt loam to silty clay loam. Silty clay	ML or CL MH or CH
SeC	Sequoia silt loam, sloping phase.	20 or more	1.5 to 4.0	Well-drained soil on rolling uplands. Developed in residuum from shale. Bedrock is soft shale.	0 to 8 8 to 26	Silt loam Silty clay	ML or CL MH or CH
SlC3 SlD3	Sequoia silty clay Severely eroded sloping phase. Severely eroded moderately steep phase.	20 or more	1.0 to 2.0	Well-drained soils on rolling to hilly uplands. Bedrock is soft shale.	0 to 18	Silty clay	MH or CH
StD StF	Steekee loam Moderately steep phase. Very steep phase.	20 or more	0.0 to 2.0	Excessively drained, shallow soils on steep ridges. Developed in residuum from calcareous sandstone and sandy shale.	0 to 8 8 to 18	Loam Loam	SM or SC SM or SC
SvF	Steekee shaly loam, very steep phase.	20 or more	0.0 to 1.0	Excessively drained, shallow soil on steep ridges. Developed in residuum from calcareous sandstone and sandy shale.	0 to 12	Shaly loam to shaly fine sandy loam.	SM or SC

estimated physical properties—Continued

Classification—Con.	Percentage passing—			Selected characteristics significant in engineering					
AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Permeability	Structure	Available water	pH	Dispersion	Shrink-swell potential
				Inches per hour		*Inches per foot of depth*			
A–4	50 to 60	65 to 85	70 to 90	2.5 to 5.0	Granular	1.2 to 1.8	5.1 to 5.5	High	Low.
A–4 or A–6	50 to 60	65 to 85	70 to 90	0.8 to 2.5	Blocky	1.2 to 1.8	4.5 to 5.0	Moderate	Moderate.
A–6 or A–7	50 to 65	65 to 85	70 to 90	0.8 to 2.5		1.2 to 1.8	4.5 to 5.0	Moderate	Moderate.
A–4	85 to 95	95 to 100	95 to 100	0.2 to 0.8	Crumb	1.8 to 2.4	4.5 to 5.0	High	Moderate.
A–6	95 to 100	95 to 100	95 to 100	0.2 to 0.8	Massive	1.2 to 1.8	4.5 to 5.0	Moderate	High.
A–7 or A6–	95 to 100	95 to 100	95 to 100	<0.2	Massive	1.2 to 1.8	4.5 to 5.0	Low	High.
A–4	45 to 60	90 to 100	95 to 100	0.8 to 2.5	Granular	1.8 to 2.4	5.6 to 6.0	High	Low.
A–4	55 to 65	90 to 100	95 to 100	0.8 to 2.5	Blocky	1.8 to 2.4	5.6 to 6.0	High	Moderate.
A–4 or A–6	65 to 75	90 to 100	95 to 100	0.8 to 2.5	Granular	2.4 to 3.0	5.6 to 6.0	High	Moderate.
A–6	70 to 80	90 to 100	95 to 100	0.8 to 2.5	Blocky	1.8 to 2.4	5.6 to 6.0	Moderate	High.
A–4 or A–6	90 to 95	95 to 100	95 to 100	0.2 to 0.8	Granular and blocky.	1.8 to 2.4	5.1 to 5.5	Moderate	Moderate.
A–7	90 to 100	95 to 100	95 to 100	0.2 to 0.8	Blocky	1.2 to 2.4	4.5 to 5.0	Low	High.
A–4 or A–6	90 to 95	95 to 100	95 to 100	0.8 to 2.5	Granular	1.8 to 3.0	5.1 to 5.5	Moderate	Moderate.
A–7	90 to 100	95 to 100	95 to 100	0.2 to 0.8	Blocky	1.8 to 2.4	4.5 to 5.0	Low	High.
A–7	80 to 90	85 to 95	90 to 95	0.2 to 0.8	Blocky	1.2 to 2.4	4.5 to 5.0	Low	High.
A–4	35 to 45	85 to 100	90 to 100	0.8 to 2.5	Granular	1.8 to 2.4	5.1 to 5.5	High	Moderate.
A–2 or A–4	30 to 45	80 to 100	85 to 100	0.8 to 2.5	Blocky	1.2 to 1.8	5.1 to 5.5	High	Moderate.
A–2 or A–4	25 to 40	70 to 90	75 to 90	0.8 to 2.5	Granular	0.6 to 1.2	5.1 to 5.5	High	Moderate.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	Classification	
						USDA textural class	Unified
		Feet	*Feet*		*Inches*		
Ta	Taft silt loam	0	8.0 to 25.0	Imperfectly drained soil on nearly level, old terraces. Developed in fine-textured alluvial deposits. Underlain mainly by limestone.	0 to 8 8 to 20 20 to 40	Silt loam Silty clay loam Silty clay loam to silty clay.	ML or CL CL CL
TbC2	Talbott silty clay loam, eroded sloping phase.	20 or more	1.5 to 5.0	Well-drained, fine-textured soil on rolling to hilly uplands. Developed in residuum from argillaceous limestone. A few bedrock outcrops.	0 to 9 9 to 40	Silty clay loam to silty clay. Clay	ML or CL MH or CH
TcC3	Talbott silty clay Severely eroded sloping phase.	20 or more	1.5 to 5.0	Well-drained, fine-textured soils on rolling to hilly uplands. Developed in residuum from argillaceous limestone. A few bedrock outcrops.	0 to 9	Silty clay loam to silty clay.	ML or CL
TcD3	Severely eroded moderately steep phase.				9 to 40	Clay	MH or CH
Td	Talbott and Colbert very rocky soils, 5 to 25 percent slopes.	20 or more	0 to 2.0	Well-drained upland soils with many bedrock outcrops. Bedrock is argillaceous limestone. Soil material is fine textured and highly variable in depth between the rock ledges.	0 to 5 5 to 20	Silty clay loam Silty clay to clay	ML or CL MH or CH
	Tellico loam	20 or more	2.0 to 8.0	Well-drained soils on dominantly steep and very steep uplands. Developed in residuum from calcareous sandstone.	0 to 8	Loam to fine sandy loam.	ML or CL
TlC2	Eroded sloping phase.				8 to 39	Clay loam	CL
TlD2	Eroded moderately steep phase.				39 to 76	Clay loam to sandy clay.	MH or CH
TlE2	Eroded steep phase.						
TlF	Very steep phase.						
	Tellico clay loam	20 or more	2.0 to 7.0	Well-drained soils on dominantly steep and very steep uplands. Developed in residuum from calcareous sandstone. Bedrock is calcareous sandstone.	0 to 7	Clay loam	CL
TgC3	Severely eroded sloping phase.				7 to 50	Clay loam to sandy clay.	MH or CH
TgD3	Severely eroded moderately steep phase.						
TgE3	Severely eroded steep phase.						
TgF3	Severely eroded very steep phase.						
	Waynesboro loam	20 or more	3.0 to 15.0	Well-drained soils on high terraces. Developed in old gravelly alluvium. Bedrock is chiefly limestone and shale.	1 to 11	Loam to clay loam	ML
WlB2	Eroded gently sloping phase.						
WlC	Sloping phase.				11 to 16	Clay loam	ML or CL
WlC2	Eroded sloping phase.				16 to 50	Clay loam to sandy clay.	MH or CH
WlD2	Eroded moderately steep phase.						
WlE2	Eroded steep phase.						
	Waynesboro gravelly loam.	20 or more	3.0 to 25.0	Well-drained soils on high terraces. Developed in old gravelly alluvium. Bedrock is chiefly limestone and shale.	0 to 7	Gravelly loam to gravelly clay loam.	SM, SC, or ML.
WgC2	Eroded sloping phase.				7 to 48	Gravelly clay loam to gravelly sandy clay.	CL
WgD2	Eroded moderately steep phase.						
WgE2	Eroded steep phase.						

estimated physical properties—Continued

Classification—Con.	Percentage passing—			Selected characteristics significant in engineering					
AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Permeability	Structure	Available water	pH	Dispersion	Shrink-swell potential
				Inches per hour		*Inches per foot of depth*			
A-4	85 to 95	95 to 100	95 to 100	0.2 to 0.8	Granular	1.8 to 2.4	5.1 to 5.5	High	Moderate.
A-6	95 to 100	95 to 100	95 to 100	0.2 to 0.8	Blocky	1.2 to 1.8	4.5 to 5.0	Moderate	High.
A-7	95 to 100	95 to 100	95 to 100	<0.2	Massive	1.2 to 1.8	4.5 to 5.0	Low	High.
A-6 or A-7	90 to 100	95 to 100	100	0.2 to 0.8	Granular and blocky.	1.8 to 2.4	5.1 to 5.5	Moderate	High.
A-7	95 to 100	95 to 100	100	0.2 to 0.8	Blocky	1.2 to 1.8	4.5 to 5.0	Low	High.
A-6 or A-7	90 to 100	95 to 100	100	0.2 to 0.8	Granular and blocky.	1.8 to 2.4	5.1 to 5.5	Moderate	High.
A-7	95 to 100	95 to 100	100	0.2 to 0.8	Blocky	1.2 to 1.8	4.5 to 5.0	Low	High.
A-7	85 to 95	85 to 95	85 to 95	0.2 to 0.8	Granular	0.6 to 1.2	5.1 to 6.0	Low	High.
A-7	85 to 95	85 to 95	85 to 95	0.2 to 0.8	Blocky	0.6 to 1.2	5.1 to 6.0	Low	High.
A-4	55 to 65	95 to 100	95 to 100	0.8 to 2.5	Crumb	2.4 to 3.0	5.1 to 5.6	High	Moderate.
A-6	70 to 75	95 to 100	95 to 100	0.8 to 2.5	Blocky	1.8 to 2.4	5.1 to 5.6	Moderate	High.
A-7	70 to 80	95 to 100	95 to 100	0.8 to 2.5	Blocky	1.8 to 2.4	5.1 to 5.6	Moderate	High.
A-6	70 to 75	95 to 100	95 to 100	0.8 to 2.5	Granular	1.8 to 2.4	5.1 to 5.6	Moderate	Moderate.
A-7	70 to 80	95 to 100	95 to 100	0.8 to 2.5	Blocky	1.8 to 2.4	5.1 to 5.6	Moderate	High.
A-4	45 to 65	80 to 95	85 to 100	0.8 to 2.5	Granular and blocky.	1.8 to 3.0	5.1 to 5.6	High	Moderate.
A-6 or A-7	45 to 65	80 to 95	85 to 100	0.8 to 2.5	Blocky	1.8 to 2.4	4.5 to 5.0	Moderate	High.
A-7	45 to 75	85 to 95	90 to 100	0.8 to 2.5	Blocky	1.2 to 2.4	4.5 to 5.0	Moderate	High.
A-4	40 to 60	65 to 85	65 to 85	0.8 to 2.5	Granular	1.8 to 2.4	5.1 to 5.6	High	Moderate.
A-6 or A-7	45 to 70	50 to 70	55 to 80	0.8 to 2.5	Blocky	1.2 to 1.8	4.5 to 5.0	Moderate	High.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	Classification	
						USDA textural class	Unified
	Waynesboro gravelly clay loam.	20 or more	3.0 to 25.0	Well-drained soils on high terraces. Developed in old gravelly alluvium. Bedrock is chiefly limestone and shale.	0 to 7	Gravelly loam to gravelly clay loam.	SM, ML or CL.
WkD3	Severely eroded moderately steep phase.				7 to 48	Gravelly clay loam to gravelly sandy clay.	CL or MH
WkE3	Severely eroded steep phase.						
WmD3	Waynesboro clay loam, severely eroded moderately steep phase.	20 or more	3.0 to 15.0	Well-drained soil on high terraces. Developed in old gravelly alluvium. Bedrock is chiefly limestone and shale.	1 to 11	Loam to clay loam	CL
					11 to 16	Clay loam	ML or CL
					16 to 50	Clay loam to sandy clay.	MH or CH
Wo	Wolftever silt loam	0	10.0 to 25.0	Moderately well drained soil on low terraces or second bottoms. Developed in fine-textured alluvium. Bedrock is usually limestone.	0 to 8	Silt loam	ML or CL
					8 to 36	Silty clay loam	CL

estimated physical properties—Continued

Classification—Con.	Percentage passing—			Selected characteristics significant in engineering					
AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Permeability	Structure	Available water	pH	Dispersion	Shrink-swell potential
A–4	45 to 65	65 to 85	65 to 85	0.8 to 2.5	Granular	1.8 to 2.4	5.1 to 5.6	High	Moderate.
A–6 or A–7	45 to 70	50 to 70	55 to 80	0.8 to 2.5	Blocky	1.2 to 1.8	4.5 to 5.0	Moderate	High.
A–4	45 to 65	80 to 95	85 to 100	0.8 to 2.5	Granular and blocky.	1.8 to 3.0	5.1 to 5.6	High	Moderate.
A–6 or A–7	45 to 65	80 to 95	85 to 100	0.8 to 2.5	Blocky	1.8 to 2.4	4.5 to 5.0	Moderate	High.
A–7	45 to 75	90 to 100	90 to 100	0.8 to 2.5	Blocky	1.2 to 2.4	4.5 to 5.0	Moderate	High.
A–6	85 to 95	90 to 100	90 to 100	0.8 to 2.5	Granular	1.8 to 2.4	5.1 to 6.0	Moderate	Moderate.
A–6 or A–7	90 to 100	90 to 100	90 to 100	0.2 to 0.8	Blocky	1.2 to 1.8	5.1 to 6.0	Moderate	High.

Features Affecting Engineering Work

Table 6 lists, for each mapping unit, specific features that adversely or favorably affect highway work or soil and water conservation work. These features are generally not apparent to the engineer unless he has access to the results of a field investigation. They are, however, significant enough to influence construction practices.

The location of secondary roads in areas where the soils are sloping, moderately steep, or steep may be influenced by the depth to bedrock and the kind of bedrock. The engineer should ascertain the type of rock so as to know how difficult it will be to excavate. For all highways, he should investigate the likelihood of slides in the dipping strata and of seepage of water along or through the bedrock. The presence of poor material within or slightly below the subgrade should be considered. A layer of highly plastic clay impedes internal drainage and provides a poor foundation. In some places, the clay layer should be cut out before the pavement is constructed. If this is not feasible, as might be the case in low, flat, or poorly drained areas, the roadway should be built well above the plastic clay layer by using an embankment section. Boulders, cobblestones, and stones are likely to cause grading problems.

Vertical alignment of roads is affected by poor drainage. An embankment section should be constructed to keep the roadway above high water in places where there is a seasonally high water table, as on the Barbourville, Congaree, Emory, Greendale, Landisburg, Leadvale, and Sequatchie soils. The Greendale, Huntington, Lindside, Lobelville, Melvin, Neubert, Robertsville, Taft, and Wolftever soils, in addition, are occasionally flooded. An embankment section should be constructed to protect roadways on these soils also. Interceptor ditches or underdrains may be needed where there is subsurface seepage, which is common at the base of slopes in deposits of local alluvium. The slumping or sliding of the overlying material may be a result of seepage in the backslopes of cuts. The depth to bedrock also affects vertical alignment.

In most of the county, earthwork is difficult during prolonged wet periods, but it is possible to excavate, haul, and compact the better drained, coarse-grained soil materials. The silty and clayey materials may absorb so much

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability for winter grading	Suitability of material for—		Suitability as source of—	
		Road subgrade	Road fill	Topsoil	Sand and gravel
Alcoa (AcB, AcC)	Unsuitable	Poor	Poor to fair	Good	Unsuitable
Barbourville (Ba)	Poor to fair	Poor to fair	Poor to fair	Good	Unsuitable
Bland (BnC, BnD)	Unsuitable	Poor	Poor	Unsuitable	Unsuitable
Bolton (BoC2, BoD2, BoE2)	Unsuitable	Poor	Poor	Good	Unsuitable
Clarksville (CaC, CaD, CaE, CaF)	Good	Fair to good	Good	Unsuitable	Fair
Colbert (CbC)	Unsuitable	Poor	Poor	Unsuitable	Unsuitable
Congaree (CoA, CoC)	Good	Fair	Fair	Good	Poor
Cumberland (CmB2, CmC2, CmC3, CmD2, CmD3, CmE2, CuC2, CuD2, CrE3)	Unsuitable	Poor	Poor	Fair	Unsuitable
Decatur (DcB2, DcC2, DcC3, DcD2, DcD3)	Unsuitable	Poor	Poor	Fair	Unsuitable
Dewey (DeB2, DeC2, DeD2, DeE2, DwC3, DwD3, DwE3)	Unsuitable	Poor	Poor	Fair	Unsuitable
Emory (Em, Er)	Poor	Poor	Poor	Good	Unsuitable
Etowah (EtB, EtC2, EtD2)	Unsuitable	Poor	Poor	Good	Unsuitable
Farragut (FaB2, FaC2, FaD2, FbC3, FbD3, FbE3)	Unsuitable	Poor	Poor	Poor to fair	Unsuitable
Fullerton (FcC, FcD, FcE, FcF, FdD3, FdE3, FdF3, FsB, FsC, FsD, FsE, FsF, FtC3, FtD3, FtE3)	Poor	Poor	Poor to fair	Poor to fair	Unsuitable

water during wet periods that they cannot be readily dried to the optimum moisture content, which is most favorable for proper compaction.

A rating of the suitability of each soil as a source of subgrade and road fill material is also given in table 6. As a general rule, the most desirable materials are very coarse grained and easily drained. Natural materials that are suitable for use in base courses and road fill are scarce in this county. The most suitable deposits are found in the Clarksville, Lehew, Nolichucky, and Steekee soils.

Chert gravel may be used economically for secondary and county roads, but normally it is not durable enough to be used in concrete structures or for base material for primary roads. Crushed limestone is much more satisfactory, but in poor soil chert can be used under suitable crushed limestone to decrease the amount of crushed limestone required. There are several quarries from which limestone is obtained; most of them are in Talbott and Colbert very rocky soils and Rockland.

Also in table 6, each soil is rated as a source of topsoil and as a source of sand and gravel. Since in most soils the original surface soil is 7 inches or less thick and may even be absent because of sheet erosion, the rating as a source of topsoil material refers to the material below the thin surface layer. However, for young soils like Barbourville, Congaree, Emory, Greendale, and Huntington, and a few other soils that do not have distinct horizons, the rating applies to the entire soil profile.

The engineering problems of soil and water conservation are evaluated in table 6. The construction of farm ponds is impeded by permeable substrata, cavernous bedrock, and inadequate or insufficient embankment material. A loss of stored water may result if there are permeable substrata near the surface. Where caverns exist in limestone bedrock, the water may escape through the soil layer into the cavernous rock. The soils of Loudon County are rated according to the risk of failure of the reservoir. "Low risk" means that the chances of excess seepage in the reservoir area are small. "Shallow over bedrock" means that a small amount of fill material is available; it may also mean, particularly in the case of limestone, that the cavernous bedrock is close to the surface.

interpretations

Features affecting suitability for—					
Farm ponds			Agricultural drainage	Irrigation	Terraces and diversions
Characteristics that affect suitability of soil for reservoir area	Risk of excess seepage	Stability in embankments			
Permeable soil that favors excess seepage; bedrock may be cavernous.	Moderate	Poor to fair	(1)	(2)	(3).
Bedrock that is tight-bedded shale.	Low	Poor to good	(1)	(2)	(3).
Shaly limestone bedrock near surface.	Moderate	Poor to fair; limited soil material.	(1)	Shallowness over bedrock; low water-holding capacity.	Shallowness over bedrock.
Permeable soil that favors excess seepage.	High	Poor to good	(1)	(2)	(3).
Moderately permeable soil	Moderate	Fair to good	(1)	Low water-holding capacity.	(3).
Bedrock that may be cavernous.	Moderate to low	Poor; limited soil material.	Clayey, slowly permeable subsoil.	Shallowness over bedrock.	Shallowness over bedrock.
High permeability that favors excess seepage.	High	Fair to good	(1)	(2)	(3).
Permeable soil that favors excess seepage.	High	Poor to fair	(1)	(2)	(3).
Permeable soil that favors excess seepage.	High	Poor to fair	(1)	(2)	(3).
Permeable soil that favors excess seepage.	High	Fair to good	(1)	(2)	(3).
High permeability that favors excess seepage.	High	Fair	(1)	(2)	(3).
Permeable soil that favors excess seepage.	High	Good	(1)	(2)	(3).
Moderate to slow permeability; some shale in bedrock.	Low	Poor to fair	(1)	(2)	(3).
Permeable soil that favors excess seepage.	High to moderate	Poor to fair	(1)	Some have low water-holding capacity; low fertility.	(3).

See footnotes at end of table.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability for winter grading	Suitability of material for—		Suitability as source of—	
		Road subgrade	Road fill	Topsoil	Sand and gravel
Greendale (Gc, Ge)	Poor	Poor to fair	Poor to fair	Good	Unsuitable
Gullied land, limestone materials (Gl)	Unsuitable	Poor	Poor	Unsuitable	Unsuitable
Gullied land, shale materials (Gs)	Poor to fair	Fair	Fair	Unsuitable	Unsuitable
Hermitage (HcC, HeB, HeC2)	Unsuitable	Poor to fair	Poor to fair	Good	Unsuitable
Huntington (HnA, HnC)	Unsuitable to poor.	Poor to fair	Poor to fair	Good	Unsuitable
Landisburg (LcB, LdB, LdC2)	Unsuitable	Poor to fair	Poor to fair	Poor to fair	Unsuitable
Leadvale (LeB)	Unsuitable	Poor	Poor	Poor to fair	Unsuitable
Lehew (LhD, LhE, LhF)	Good	Good	Good	Poor	Unsuitable
Lindside (Ln, Lo, Ha, Hb)	Unsuitable	Poor to fair	Poor to fair	Fair to good	Unsuitable
Litz (LsC, LsD, LsE, LtC, LtD, LtE)	Poor to fair	Poor to fair	Poor to fair	Poor	Unsuitable
Lobelville (Lu)	Unsuitable	Fair	Fair	Poor to fair	Unsuitable
Melvin (Me)	Unsuitable	Poor to fair	Poor	Poor to fair	Unsuitable
Minvale (MrC2, MsB, MsC2)	Unsuitable to poor.	Poor	Fair to poor	Fair	Unsuitable
Neubert (Ne)	Unsuitable to poor.	Fair	Fair	Good	Unsuitable
Nolichucky (NoC, NoD2)	Fair	Fair	Fair	Poor	Poor
Robertsville (Rb)	Unsuitable	Poor	Poor	Poor	Unsuitable
Sequatchie (SaB, ScB, ScC)	Fair	Fair	Fair	Good	Unsuitable
Sequoia (SeC, SkB2, SkC2, SkD2, SlC3, SlD3)	Unsuitable	Poor	Poor	Poor to fair	Unsuitable
Steekee (Std, StF, SvF)	Good	Fair to good	Fair to good	Poor to fair	Unsuitable
Taft (Ta)	Unsuitable	Poor	Poor	Poor to fair	Unsuitable
Talbott (TbC2, TcC3, TcD3)	Unsuitable	Poor	Poor	Poor	Unsuitable
Tellico (TgC3, TgD3, TgE3, TgF3, TlC2, TlD2, TlE2, TlF)	Unsuitable	Poor	Poor	Good to fair	Unsuitable
Waynesboro (WgC2, WgD2, WgE2, WkD3, WkE3, WlB2, WlC, WlC2, WlD2, WlE2, WmD3)	Unsuitable	Poor	Fair to poor	Fair	Unsuitable
Wolftever (Wo)	Unsuitable	Poor	Poor	Fair	Unsuitable

[1] Good natural drainage.

[2] Soil properties are favorable for irrigation.

interpretations—Continued

Features affecting suitability for—					
Farm ponds			Agricultural drainage	Irrigation	Terraces and diversions
Characteristics that affect suitability of soil for reservoir area	Risk of excess seepage	Stability in embankments			
High permeability that favors excess seepage.	Moderate to high	Fair	(1)	(2)	(3).
Cavernous bedrock; excess silting; poor site.	High	Fair; amount of available soil material may be limited.	(1)	Severe erosion	Severe erosion.
Tight-bedded rock; excess silting makes site very poor.	Low	Fair; limited soil material.	(1)	Severe erosion	Severe erosion.
Permeable soil that favors excess seepage.	High	Good	(1)	(2)	(3).
Soil usually borders permanent stream.	High	Good	(1)	(2)	(3).
Easy to compact	Low if reservoir is built above pan layer.	Good	Pan at about 2 feet.	Pan at about 2 feet; moderate response.	(3).
Shale bedrock	Low	Fair	Pan at about 2 feet.	Pan at about 2 feet; moderate response.	(3).
Very shallow over hard bedrock.	Low if sufficient soil is available.	Fair; limited soil material.	(1)	Shallow soil; low water-holding capacity.	Shallowness over bedrock.
Soil is permeable and bedrock is usually broken where underlain by limestone.	High over limestone; low over shale bedrock.	Fair to good	Seasonally high water table; permeable soil.	(2)	(3).
Bedrock is soft, tight-bedded shale.	Low	Fair; limited soil material.	(1)	Shallowness over bedrock; low water-holding capacity.	Shallowness over bedrock.
Permeable soil underlain by broken bedrock; coarse material easy to compact.	Moderate	Fair	Seasonally high water table; permeable soil.	Cherty soil; moderate response.	(3).
Moderate seepage likely; underlain by limestone.	Moderate to high	Good	Seasonally high water table; permeable soil.	Poor drainage; seasonally high water table.	(3).
Permeable soil favors excess seepage.	High	Good	(1)	(2)	(3).
Very permeable soil favors excess seepage.	High	Fair	(1)	(2)	(3).
Well-graded material that is easy to compact.	Low if soil material is compacted.	Good	(1)	Gravelly soil; moderate response.	(3).
Subsoil is slowly permeable; best suited to shallow reservoirs.	Low	Good	Very slowly permeable subsoil.	Poor drainage; slowly permeable subsoil.	Nearly level soils and poor drainage.
Very permeable soil; excess seepage.	High	Fair	(1)	(2)	(3).
Tight-bedded shale	Low	Poor to fair	(1)	Moderate depth to shale bedrock.	(3).
Shale and some sandstone	Low	Good; limited soil material.	(1)	Shallowness over bedrock; low water-holding capacity.	Severe erosion; shallowness over bedrock.
Slowly permeable subsoil; best suited to shallow reservoirs.	Low	Good	Slowly permeable subsoil.	Imperfect drainage and slow permeability.	Nearly level soils and imperfect drainage.
Broken limestone bedrock	High	Poor to fair; soil shallow in some areas.	(1)	Medium available water holding capacity.	A few bedrock outcrops.
Soil is permeable and excess seepage is likely; fairly easy to compact.	Moderate	Poor to fair	(1)	Generally steep slopes and severe erosion.	Severe erosion.
Soil is permeable but can be compacted.	Moderate	Fair	(1)	(2)	(3).
Subsoil is slowly permeable	Low	Good	Slowly permeable subsoil.	Slowly permeable in subsoil.	(3).

[3] Soil properties are favorable for terraces and diversions.

Planning Engineering Soil Surveys

At many construction sites, major variations in the soil occur within the depth of the proposed excavation, and several soil units may be found within a short distance. The soil maps and profile descriptions, as well as the engineering descriptions given in this section, should be used in planning detailed surveys of soils at construction sites. Using the information in the soil survey reports will enable the soils engineer to concentrate on the most suitable soil units. Then a minimum number of soil samples will be required for laboratory testing, and an adequate investigation can be made at a minimum cost.

Descriptions of Soils and Land Types

This section provides detailed information about the mapping units, which are the areas shown and identified on the detailed soil map. The soil series are described in alphabetic order. The mapping units within each series are described in order of increasing slope gradient and degree of erosion.

An important part of the soil description is the soil profile, a record of what the soil scientist saw when he examined the soil. If only one profile is given for a series, you may assume that all other soils in the series have essentially the same kind of profile and that differences are explained in the descriptions of the mapping units. The differences, if any, would probably be in the texture or thickness of the surface soil. If the profiles of the soil types within a series differ significantly, more than one profile is described.

Following the name of each mapping unit are three sets of parentheses. In the first set is the slope range of the soil; in the second is the symbol used to identify the soil on the detailed map; in the third is the symbol of the capability unit to which the mapping unit is assigned. The description that follows points out erosion, slope, or other properties that distinguish this soil from others in the same series.

The characteristics emphasized for a single soil are those that directly affect its management. For example, there are four Dewey soils that have a silty clay loam surface soil and that are similar in profile and in degree of erosion. These soils, however, differ in slope, a characteristic that affects their management.

The location and distribution of the soils are shown on the soil map at the back of this report. The approximate acreage and proportionate extent of each soil are given in table 7. The Glossary at the end of this report defines "series," "type," "phase," and many other special terms.

TABLE 7.—*Approximate acreage and proportionate extent of the soils mapped in Loudon County, Tenn.*

Soil	Acres	Percent
Alcoa loam:		
Gently sloping phase	211	0. 1
Sloping phase	469	. 3
Barbourville silt loam	187	. 1
Bland silty clay loam:		
Sloping phase	323	. 2
Moderately steep phase	308	. 2
Bolton silt loam:		
Eroded sloping phase	635	. 4
Eroded moderately steep phase	1, 088	. 7
Eroded steep phase	859	. 6
Clarksville cherty silt loam:		
Sloping phase	717	. 5
Moderately steep phase	1, 257	. 8
Steep phase	1, 097	. 7
Very steep phase	475	. 3
Colbert silty clay loam, sloping phase	255	. 2
Congaree loam:		
Nearly level phase	1, 053	. 7
Sloping phase	252	. 2
Cumberland silty clay loam:		
Eroded gently sloping phase	409	. 3
Eroded sloping phase	2, 793	1. 9
Severely eroded sloping phase	684	. 5
Eroded moderately steep phase	837	. 6
Severely eroded moderately steep phase	894	. 6
Eroded steep phase	395	. 3
Cumberland gravelly clay loam:		
Eroded sloping phase	187	. 1
Eroded moderately steep phase	283	. 2
Cumberland and Decatur silty clay loams, severely eroded steep phases	387	. 3
Decatur silty clay loam:		
Eroded gently sloping phase	385	. 3
Eroded sloping phase	2, 594	1. 7
Severely eroded sloping phase	854	. 6
Eroded moderately steep phase	498	. 3
Decatur silty clay, severely eroded moderately steep phase	868	. 6
Dewey silty clay loam:		
Eroded gently sloping phase	748	0. 5
Eroded sloping phase	6, 046	4. 0
Eroded moderately steep phase	2, 485	1. 6
Eroded steep phase	588	. 4
Dewey silty clay:		
Severely eroded sloping phase	1, 519	1. 0
Severely eroded moderately steep phase	2, 648	1. 7
Severely eroded steep phase	558	. 4
Emory silt loam	4, 292	2. 8
Emory silty clay loam	441	. 3
Etowah silt loam:		
Gently sloping phase	654	. 4
Eroded sloping phase	669	. 4
Eroded moderately steep phase	186	. 1
Farragut silty clay loam:		
Eroded gently sloping phase	164	. 1
Eroded sloping phase	631	. 4
Eroded moderately steep phase	226	. 1
Farragut silty clay:		
Severely eroded sloping phase	600	. 4
Severely eroded moderately steep phase	674	. 4
Severely eroded steep phase	227	. 2
Fullerton cherty silt loam:		
Sloping phase	8, 043	5. 3
Moderately steep phase	10, 613	7. 0
Steep phase	8, 037	5. 3
Very steep phase	2, 536	1. 7
Fullerton cherty silty clay loam:		
Severely eroded moderately steep phase	1, 032	. 7
Severely eroded steep phase	687	. 5
Severely eroded very steep phase	234	. 2
Fullerton silt loam:		
Gently sloping phase	814	. 5
Sloping phase	10, 553	7. 0
Moderately steep phase	6, 257	4. 1
Steep phase	3, 136	2. 1
Very steep phase	572	. 4

TABLE 7.—*Approximate acreage and proportionate extent of the soils mapped in Loudon County, Tenn.*—Continued

Soil	Acres	Percent
Fullerton silty clay loam:		
Severely eroded sloping phase	614	0.4
Severely eroded moderately steep phase	2,228	1.5
Severely eroded steep phase	826	.5
Greendale silt loam	2,205	1.5
Greendale cherty silt loam	894	.6
Gullied land:		
Limestone materials	1,547	1.0
Shale materials	648	.4
Hermitage silt loam:		
Gently sloping phase	1,589	1.1
Eroded sloping phase	2,128	1.4
Hermitage cherty silt loam, sloping phase	260	.2
Huntington loam:		
Nearly level phase	1,155	.8
Sloping phase	260	.2
Landisburg silt loam:		
Gently sloping phase	667	.4
Eroded sloping phase	358	.2
Landisburg cherty silt loam, gently sloping phase	340	.2
Leadvale silt loam, gently sloping phase	471	.3
Lehew loam:		
Moderately steep phase	449	.3
Steep phase	370	.2
Very steep phase	479	.3
Lindside silt loam	1,930	1.3
Lindside silt loam, local alluvium phase	928	.6
Litz silt loam:		
Sloping phase	963	.6
Moderately steep phase	540	.4
Steep phase	315	.2
Litz shaly silty clay loam:		
Sloping phase	936	.6
Moderately steep phase	888	.6
Steep phase	220	.1
Lobelville cherty silt loam	182	.1
Made land	345	.2
Melvin silt loam	674	.4
Minvale silt loam:		
Gently sloping phase	439	.3
Eroded sloping phase	1,208	.8
Minvale cherty silt loam, eroded sloping phase	658	.4
Neubert loam	888	.6
Nolichucky gravelly fine sandy loam:		
Sloping phase	357	.2
Eroded moderately steep phase	219	.1
Quarry	127	.1
Robertsville silt loam	110	.1
Rockland	2,983	2.0
Sequatchie fine sandy loam, gently sloping phase	236	.2
Sequatchie loam:		
Gently sloping phase	264	0.2
Sloping phase	264	.2
Sequoia silty clay loam:		
Eroded gently sloping phase	1,079	.7
Eroded sloping phase	1,965	1.3
Eroded moderately steep phase	342	.2
Sequoia silt loam, sloping phase	248	.2
Sequoia silty clay:		
Severely eroded sloping phase	1,256	.8
Severely eroded moderately steep phase	503	.3
Steekee loam:		
Moderately steep phase	156	.1
Very steep phase	320	.2
Steekee shaly loam, very steep phase	969	.6
Taft silt loam	183	.1
Talbott silty clay loam, eroded sloping phase	709	.5
Talbott silty clay:		
Severely eroded sloping phase	445	.3
Severely eroded moderately steep phase	453	.3
Talbott and Colbert very rocky soils, 5 to 25 percent slopes	773	.5
Tellico loam:		
Eroded sloping phase	1,334	.9
Eroded moderately steep phase	737	.5
Eroded steep phase	513	.3
Very steep phase	238	.2
Tellico clay loam:		
Severely eroded sloping phase	349	.2
Severely eroded moderately steep phase	700	.5
Severely eroded steep phase	697	.5
Severely eroded very steep phase	803	.5
Waynesboro loam:		
Eroded gently sloping phase	153	.1
Sloping phase	246	.2
Eroded sloping phase	1,617	1.1
Eroded moderately steep phase	801	.5
Eroded steep phase	661	.4
Waynesboro gravelly loam:		
Eroded sloping phase	504	.3
Eroded moderately steep phase	388	.3
Eroded steep phase	262	.2
Waynesboro gravelly clay loam:		
Severely eroded moderately steep phase	239	.2
Severely eroded steep phase	222	.1
Waynesboro clay loam, severely eroded moderately steep phase	331	.2
Wolftever silt loam	165	.1
Total	151,323	100.0

Alcoa Series

The soils of the Alcoa series are deep, well drained, and productive. Typically, they have a surface soil of dark reddish-brown friable loam and a subsoil of dark reddish-brown to dark-red clay loam. They have developed in colluvium or local alluvium that rolled or was washed from the reddish, sandy Tellico and Steekee soils of the uplands. The relief is generally undulating and rolling.

Alcoa soils are on benches and foot slopes in the region known as the "Red Knobs" of Loudon County. Even though the individual areas are small—mostly 1 to 3 acres in size—and the total acreage is small, they are very important in the Red Knobs section because they comprise a high proportion of the cropland in that part of the county.

Alcoa soils are associated with Neubert soils, which are along intermittent drains and in depressions, and with Tellico and Steekee soils, which are on the adjacent steep upland slopes. Alcoa soils are similar to Hermitage soils but were derived from a different kind of parent material and are a little more sandy throughout.

The Alcoa soils are moderately high in fertility, have a fair content of organic matter, and are medium acid to strongly acid. Because of their mild, concave slopes and moderate permeability, they have a high moisture-supplying capacity. They are easy to work and easy to keep in good tilth.

Alcoa loam, gently sloping phase (2 to 5 percent slopes) (AcB) (capability unit IIe–1).—This soil is on gently sloping benches and foot slopes below areas of Tellico and Steekee soils. Because the slopes are mild, this soil is practically uneroded. It has a thick surface soil and is very deep over bedrock. A description of a representative profile follows. [6]

- A_p 0 to 6 inches, dark reddish-brown (5YR 3/3) loam; weak, fine, granular structure; very friable.
- A_3 6 to 10 inches, dark reddish-brown (5YR 3/3) loam; weak, medium, granular structure; very friable.
- B_1 10 to 14 inches, dark reddish-brown (5YR 3/3) clay loam; weak, fine, subangular blocky structure; friable.
- B_{21} 14 to 21 inches, dark reddish-brown (2.5YR 3/4) clay loam; moderate, fine, subangular blocky structure; friable.
- B_{22} 21 to 44 inches, dark reddish-brown (2.5YR 3/4) clay loam to clay; moderate, medium, subangular blocky structure; friable; a few, small, black concretions.
- B_3 44 to 60 inches, dark-red to red (2.5YR 3/6 to 4/6) clay; weak, medium, subangular blocky structure; friable; a few, small, black concretions and stains.

This soil is easy to work and conserve. It has a high moisture-supplying capacity, and the natural fertility is moderately high. It is moderately permeable and has a deep root zone.

Use and suitability.—Almost all of this soil is used rather intensively for crops. Corn, tobacco, and hay occupy most of the acreage.

This soil is well suited to all the crops commonly grown in the county. Liberal applications of complete fertilizers and lime are needed for high yields. The response to management and fertilization is excellent.

Alcoa loam, sloping phase (5 to 12 percent slopes) (AcC) (capability unit IIIe–1).—This soil is similar to Alcoa loam, gently sloping phase, except that the surface soil is thinner as a result of moderate accelerated erosion. The present surface soil is about 4 to 7 inches thick and is dark reddish-brown, very friable loam. The subsoil is friable clay loam; it may be dark reddish brown, dark red, or yellowish red.

The sediments in which this soil developed are underlain by sandy shale or calcareous sandstone residuum at depths of 2 to 10 feet. The depth to bedrock is generally more than 10 feet.

Use and suitability.—Practically all of this productive soil is now in crops and pasture, mainly crops. Very little of it is idle. It is suitable for all crops for which the climate is suitable. Corn, tobacco, and hay occupy most of the acreage. Good yields of all crops can be obtained if liberal amounts of lime and complete fertilizers are applied. The response to management and fertilization is excellent, but the soil is susceptible to erosion and cannot be used for row crops as often as the gently sloping phase.

Barbourville Series

The soils of the Barbourville series are deep and well drained. Their parent material washed from uplands underlain by acid shale and was deposited in narrow hollows and at the base of slopes. Litz, Sequoia, and Lehew soils were the sources of most of the parent material.

Barbourville soils are associated with Lindside soils. They resemble Lindside soils except that they are better drained and, in some places, have weakly developed profiles. The individual areas are generally long and narrow, and few are more than 2 acres in size.

These soils are moderately high in fertility, are moderately permeable, have a very high moisture-supplying capacity, and are medium acid. They are easy to work, easy to conserve, and easy to keep in good tilth. They are very productive. Erosion control is no problem, but overwash from adjacent slopes is damaging to some areas.

Barbourville silt loam (1 to 4 percent slopes) (Ba) (capability unit I–1).—This soil is suitable for all the crops for which the climate is suitable. Its response to management is excellent because of favorable physical properties, mild, slightly concave slopes, and very high moisture supply. A description of a representative profile follows.

- 0 to 12 inches, dark grayish-brown to dark-brown (10YR 4/2 to 4/3) silt loam; weak, medium, granular structure; very friable.
- 12 to 36 inches, yellowish-brown or dark yellowish-brown (10YR 5/4 or 4/4) fine silt loam; moderate, medium, granular structure; friable.
- 36 to 48 inches, yellowish-brown (10YR 5/4) fine silt loam to silty clay loam with a few, fine, distinct, light brownish-gray mottles; weak, medium, granular and fine, subangular blocky structure; friable.

The depth to acid shale residuum ranges from 2 to 6 feet.

Use and suitability.—Almost all of this soil is used for crops and pasture. Individual areas large enough for separate fields are farmed intensively to corn, tobacco, and garden crops. Many of the smaller tracts are farmed in conjunction with the adjoining uplands.

[6] Unless otherwise stated, soil color and consistence in all soil profile descriptions are for moist soil. Color symbols express Munsell notations.

This soil is easy to maintain, so it can be used intensively. Although the natural fertility is fairly high, liberal applications of lime and complete fertilizers are needed for high yields.

Bland Series

The soils of the Bland series are well drained, fine textured, and moderately shallow. They developed from residual material weathered from red shaly limestone or calcareous mudstone. The slopes are rolling to hilly. Deciduous trees intermingled with some redcedars formed the native vegetation.

Bland soils occur mostly in a narrow belt east of Lenoir City. They are conspicuous on the landscape because they are red and have many outcrops of bedrock.

These soils are of limited importance in agriculture. They have very low moisture-supplying capacity. They are not productive, and their response to management is poor.

Bland silty clay loam, sloping phase (5 to 12 percent slopes) (BnC) (capability unit IIIs–1).—This soil normally lies next to steeper Bland soils. Most of it is in small areas on hilltops. A small acreage is on short upland slopes. A description of a representative profile follows.

- A_p 0 to 6 inches, dark reddish-gray (5YR 4/2) silty clay loam; strong, medium, granular structure; firm.
- B_2 6 to 20 inches, weak-red (2.5YR 4/2) or dusky-red (2.5YR 3/2) silty clay or clay; strong, coarse, subangular blocky structure; very firm; a few dusky-red limestone fragments.
- D_r 20 inches, dusky-red shaly limestone or calcareous mudstone bedrock.

The depth to bedrock is variable. It ranges from only a few inches to 24 inches. In some places the bedrock is exposed.

This soil is moderately fertile. It is slightly acid and is low in organic matter. The moisture-supplying capacity is low. Permeability is moderately slow, and runoff is rapid.

Because it is shallow and fine textured, this soil is fairly difficult to work. It is highly erodible and, consequently, is difficult to conserve if cultivated.

Use and suitability.—About one-third of this soil is in cutover forest. Some cleared areas are idle, but most are used for unimproved pasture. This soil is not well suited to row crops. It appears best suited to pasture, but even pasture yields are low because the soil is droughty. It could probably be maintained in a 4-year rotation that included one row crop, but it is not responsive enough to give high yields of any of the tilled crops commonly grown in the county. Yields of small grains are better than yields of row crops.

Bland silty clay loam, moderately steep phase (12 to 20 percent slopes) (BnD) (capability unit IVs–1).—This soil is on moderately steep hillsides. It is shallower than the sloping phase and has more outcrops of bedrock. Most of it is eroded. Depending upon the degree of erosion, the surface soil ranges from dark reddish brown to dusky red in color and from silty clay loam to silty clay in texture. Because of the clayey texture and the strong slopes, infiltration is slow and runoff is rapid.

Included with this soil are a few areas that have slopes of 20 to 30 percent.

Use and suitability.—About 40 percent of the acreage is in cutover forest. The cleared acreage is mostly in unimproved pasture, but some is idle.

This soil is difficult to conserve. Because it is shallow and droughty, it is not suited to tilled crops, and it responds but slightly to management. It is best suited to forest or pasture. Any of the common pasture plants can be grown. However, pasture yields cannot be expected to be high.

Bolton Series

The soils of the Bolton series are well drained and very deep. They are characterized by a surface soil of dark-brown silt loam and a subsoil of dark-red, friable silty clay loam to clay. They have dominantly steep or moderately steep, east-facing slopes that are generally fairly long and uniform. The parent material was residuum derived from sandy dolomitic limestone.

Bolton soils are in scattered areas throughout the belts of cherty dolomitic limestone. They are associated with Fullerton and Clarksville soils. They differ from Fullerton soils in being much browner and redder throughout and in containing little or no chert. They resemble Dewey soils but have a much more friable subsoil.

These soils are moderately high in fertility, highly productive, and easy to work. They are medium acid to strongly acid and are moderately permeable. They are important to the agriculture of the county because the adjoining soils are more cherty and less productive.

Bolton silt loam, eroded sloping phase (5 to 12 percent slopes) (BoC2) (capability unit IIIe–2).—Most of this soil is on rolling ridge crests. Few of the areas are more than 3 acres in size. Most of the acreage is moderately eroded, but the present plow layer is still mostly within the original surface soil. A description of a representative profile follows.

- A_p 0 to 7 inches, dark-brown (7.5YR 3/2) silt loam; moderate, fine, granular structure; very friable.
- B_1 7 to 15 inches, dark reddish-brown (5YR 3/4) silty clay loam; weak, fine, subangular blocky structure; very friable.
- B_{21} 15 to 22 inches, dark-red (2.5YR 3/6) silty clay loam; moderate, fine and medium, subangular blocky structure; friable.
- B_{22} 22 to 44 inches, dark-red (2.5YR 3/6) clay, but nearly silty clay loam; moderate, medium, subangular blocky structure; friable; a few, small, black specks and concretions.
- B_{23} 44 to 60 inches, dark-red (2.5YR 3/6) clay, but nearly silty clay loam; moderate, medium, subangular blocky structure; friable; common, small, black concretions.
- C_1 60 to 80 inches, red (2.5YR 4/6) cherty clay; a few, fine, yellowish-brown variegations; firm; massive.

The color of the subsoil ranges from dark reddish brown or dark red to yellowish red. The color of the surface soil ranges from dark brown to dark reddish brown.

This soil is easy to keep in good tilth. Although moderately susceptible to erosion, it is not difficult to maintain. The moisture-supplying capacity is medium to high.

Use and suitability.—About 85 percent of this soil is cleared. Many kinds of crops are grown, but most of the acreage is used for pasture, along with the adjacent steeper soils.

This soil is well suited to all the crops commonly grown in the county. It will produce good yields of corn, tobacco, and vegetables, but, because of the slope and the susceptibility to erosion, it is not suitable for intensive cropping. Alfalfa, red clover, white clover, timothy, orchardgrass, fescue, and other hay and pasture plants are well suited. The response to management and fertilization is excellent.

Bolton silt loam, eroded moderately steep phase (12 to 20 percent slopes) (BoD2) (capability unit IVe–1).—This soil is on moderately long slopes below Bolton silt loam, eroded sloping phase. The individual areas are 3 to 5 acres in size and are flanked by larger areas of cherty Fullerton and Clarksville soils. Most of this phase is slightly more eroded than Bolton silt loam, eroded sloping phase, and has a thinner surface layer. A few areas have lost almost all of the original surface layer; in these places the present surface soil is dark reddish-brown to dark-red silty clay loam.

This soil is medium acid to strongly acid, and its natural fertility is moderately high. It is moderately permeable. Because of the strong slopes, its moisture-supplying capacity is only medium.

Use and suitability.—About 80 percent of this soil has been cleared and cropped. Pasture is its most common use, but corn and hay crops are also grown. Its physical properties are very favorable for plant growth, and it responds well to management and fertilization. However, because of the strong slopes, it cannot safely be used for crops except in long cropping sequences.

Bolton silt loam, eroded steep phase (20 to 30 percent slopes) (BoE2) (capability unit VIe–1).—This soil is on long slopes in the uplands. The areas are 3 to 6 acres in size. Except for having a thinner surface layer, this soil is similar to Bolton silt loam, eroded sloping phase. The surface layer ranges from 4 to 6 inches in thickness. There are small spots where the silty clay loam subsoil is exposed.

Except in the more severely eroded areas, the natural fertility of this soil is moderately high. The moisture-supplying capacity is about medium. Because the soil is steep and erodible, controlling runoff is a serious problem.

Use and suitability.—About one-third of this soil is still in hardwood forest. The cleared acreage is used chiefly for pasture; some is used for corn and hay, and a small proportion is idle.

This soil will produce good yields of all crops, but it is too steep to be tilled and is best suited to pasture. Pastures are highly productive if well fertilized.

Clarksville Series

Locally, the Clarksville soils are called "gravelly ridge land." They are light-colored, very deep soils that developed from residuum weathered from very cherty dolomitic limestone. The soil mass is about 15 to 50 percent chert fragments; this makes the soils very porous and, consequently, droughty. The landscape is one of irregular, weakly to moderately dissected hills and ridges; in some places it is much like a karst landscape.

Clarksville soils are in medium-sized to large areas throughout the belts of cherty dolomite. A large proportion of the acreage is in the strips of Fullerton and Clarksville soils that lie south of Loudon. The associated Fullerton soils are darker colored and less cherty than the Clarksville soils.

Clarksville soils are low in fertility, contain little organic matter, and are very strongly acid. Partly because of the low moisture-supplying capacity, their response to management is slight. They are suitable for forest but are of only limited importance in agriculture.

Clarksville cherty silt loam, sloping phase (5 to 12 percent slopes) (CaC) (capability unit IIIe–3).—This soil is mainly on ridge crests, above areas of steeper Clarksville or Fullerton soils. The individual areas are small and widely scattered. A description of a representative profile follows.

- A_1 0 to 1½ inches, dark grayish-brown (2.5Y 4/2) cherty silt loam; weak, medium, crumb structure; very friable.
- A_2 1½ to 8 inches, pale-brown (10YR 6/3) or light yellowish-brown (10YR 6/4) coarse cherty silt loam; weak, medium, granular structure; very friable.
- A_3 8 to 12 inches, brownish-yellow (10YR 6/6) coarse cherty silt loam; weak, medium, granular structure; very friable.
- B_1 12 to 18 inches, yellowish-brown (10YR 5/8) coarse cherty clay loam; weak, fine, subangular blocky structure; very friable.
- B_{21} 18 to 24 inches, strong-brown (7.5YR 5/8) coarse cherty clay loam; weak, fine, subangular blocky structure; friable.
- B_{22} 24 to 35 inches, strong-brown (7.5YR 5/8) cherty clay loam; some yellowish-red and yellowish-brown variegations; weak, fine, subangular blocky structure.
- B_3 35 to 49 inches, variegated yellowish-red and yellowish-brown cherty clay loam; weak, fine, subangular blocky structure; friable.
- C_1 49 to 65 inches, variegated strong-brown, yellowish-red, and brownish-yellow very cherty loam; massive.

The numerous chert fragments make this soil difficult to work. Controlling erosion is not difficult.

Use and suitability.—About half of this soil is still in forest. The cleared part is used mainly for unimproved pasture; some is idle. A few areas are used for corn and hay.

This soil will not produce high yields of any of the crops commonly grown in the county. Strawberries grow well, but they are not a common crop. Crops that mature early are relatively better suited because there is usually a good supply of moisture in the spring. Pasture, if well fertilized, produces good yields in the early part of the year. Fescue and sericea lespedeza are better suited to this soil than orchardgrass, alfalfa, and whiteclover.

Clarksville cherty silt loam, moderately steep phase (12 to 20 percent slopes) (CaD) (capability unit IVe–2).—This soil is on upland slopes, below the ridge crests occupied by Clarksville cherty silt loam, sloping phase. The areas generally are 3 to 8 acres in size. Water is absorbed rapidly; consequently, this soil is not highly erosive.

Use and suitability.—About 60 percent of this soil is in forest. The cleared acreage is mainly in unimproved pasture (fig. 9); some is idle. A very small proportion is in corn, small grains, and hay.

This soil responds only slightly to management. There is not enough moisture so that any crops except the early-maturing crops can get the maximum benefit from heavy

Figure 9.—**Unimproved pasture on Clarksville cherty silt loam, moderately steep phase.**

fertilization. Fescue, sericea lespedeza, small grains, and strawberries are the most suitable crops. Others can be grown, but high yields cannot ordinarily be expected.

Clarksville cherty silt loam, steep phase (20 to 30 percent slopes) (CaE) (capability unit VIe–2).—This soil is on upland slopes, generally in areas of 3 to 10 acres. It is associated with Fullerton soils and other Clarksville soils.

There is enough chert in this soil to interfere with farming operations and to keep the productivity low. In spite of the steep slopes, controlling erosion is not difficult because water is absorbed rapidly.

Use and suitability.—About 65 percent of this soil is in forest. Most of the cleared acreage is used for unimproved pasture, but some of it is idle.

This soil is too steep and too cherty to be suitable for tilled crops. It is better suited to grass or trees. Pasture yields are not high because the soil is droughty and low in fertility. Fescue will withstand the unfavorable conditions better than orchardgrass.

Clarksville cherty silt loam, very steep phase (30+ percent slopes) (CaF) (capability unit VIIe–1).—This soil is on upland slopes, in scattered areas 3 to 15 acres in size.

Use and suitability.—About 85 percent of this soil is in cutover forest. The cleared acreage is used mainly as unimproved pasture; some is idle.

This soil is poorly suited to crops or pasture. It is best suited to trees.

Colbert Series

The soils of the Colbert series are fine textured, very plastic, and moderately shallow. They developed on uplands in materials weathered from clayey limestone. The limestone is generally massive, but it is flaggy or even shaly in some places.

Colbert soils are well drained externally, but they contain so much clay that water and air move through them very slowly.

Small areas of Colbert soils are scattered in a narrow valleylike area that crosses the southern part of the county just south of Centersville. The topography is dominantly rolling to hilly.

These soils are associated with Talbott soils and with areas of limestone rockland. They differ from the Talbott soils in being shallower to bedrock and in having yellowish-brown rather than yellowish-red subsoil. These soils are not important to the agriculture of the county.

Colbert silty clay loam, sloping phase (5 to 12 percent slopes) (CbC) (capability unit IIIs–1).—About a third of this soil is moderately eroded. The surface layer is only 4 or 5 inches thick, and there are a few small spots where the clayey subsoil is exposed. The depth to bedrock ranges from 12 to 20 inches, but bedrock outcrops are common. A few acres are gently sloping, and a few acres are moderately steep. A description of a representative profile follows.

- A_p 0 to 5 inches, grayish-brown (10YR 5/2) silty clay loam; strong, medium, granular structure; friable.
- B_1 5 to 8 inches, dark yellowish-brown (10YR 4/4) fine silty clay loam, with some streaks and tongues of grayish brown; strong, medium, subangular blocky structure; firm.
- B_2 8 to 18 inches, yellowish-brown (10YR 5/8) clay; strong, coarse, subangular blocky structure; very firm when moist, very hard when dry, and very plastic when wet.
- C_1 18 to 20 inches, variegated yellowish-brown and strong-brown clay; massive; very firm.
- D_r 20 inches, limestone bedrock.

This soil is moderately fertile and medium acid. It is hard to keep in good tilth, and it can be cultivated only over a narrow range of moisture content. It is slowly permeable, and its moisture-supplying capacity is very low; consequently, plants are quickly damaged by drought. Because it is very susceptible to sheet erosion, this soil requires careful management to control water.

Use and suitability.—About half of this soil is in forests of hardwood and cedar trees. Some of the cleared acreage is idle, but most of it is in unimproved pasture. Yields are very low.

This soil does not ordinarily produce satisfactory yields of corn, tobacco, or other row crops. It is better suited to early-maturing crops. Yields of small grains are fair. Fescue grows better on this droughty, clayey soil than the other common pasture plants.

Congaree Series

The Congaree series consists of very deep, well-drained soils on first bottoms. They formed from stream-deposited sediments, most of which, in this county, originated in the Great Smoky Mountains, where granite and slate rocks predominate. The lack of horizon development in these soils shows that the sediments were fairly recently deposited. Except that they are darker colored and contain numerous mica flakes, Congaree soils are similar to Huntington soils.

All of the Congaree soils in Loudon County are along the Little Tennessee River. The individual areas are fairly narrow and elongated and lie parallel with the river. Generally, the relief is nearly level, but adjacent to the river there are narrow bands that are sloping. The soils are protected from floods by dams farther upstream.

Congaree soils are easy to work. They are slightly acid to neutral and are high in organic matter. The permeability is moderately rapid, and the moisture-supplying capacity is very high. The fertility and productivity are high.

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Congaree loam, nearly level phase (0 to 3 percent slopes) (CoA) (capability unit I–1).—This soil is on the nearly level and very gently sloping areas on first bottoms of the Little Tennessee River. It is probably the most productive soil in the county for row crops. It has excellent tilth and workability and is very easy to conserve. A description of a representative profile follows.

0 to 12 inches, very dark grayish-brown (10YR 3/2) loam; weak, fine, granular structure; very friable; numerous small mica flakes.
12 to 28 inches, very dark brown (10YR 2/2) loam; weak, medium, granular structure; very friable; numerous mica flakes.
28 to 42 inches, dark-brown (10YR 3/3) loam; weak, medium, granular structure; very friable; numerous mica flakes.
42 to 60 inches, dark-brown to dark yellowish-brown (10YR 3/3 to 3/4) loam; weak, medium, granular structure; very friable; numerous mica flakes.

The texture of the upper part of this soil ranges from loam to silt loam in some places. Below about 40 inches, the texture may be loam, silt loam, or fine sandy loam.

Use and suitability.—All of this soil is farmed rather intensively. Corn and hay are the chief crops. Yields of all crops are high. Although the natural fertility is high, fertilizer is needed to maintain high yields. The response to fertilization is excellent.

Congaree loam, sloping phase (5 to 12 percent slopes) (CoC) (capability unit I–1).—This soil lies in very narrow bands between two areas of Congaree loam, nearly level phase: one that is along the edge of the Little Tennessee River and one that is farther back from the stream and at a slightly higher elevation.

This soil is slightly coarser textured than Congaree loam, nearly level phase; it is generally a loam but ranges to fine sandy loam. Because of the stronger slopes, it supplies a little less moisture, but enough for good yields of all crops. Its low position and nearness to the stream partly offset the effects of the slope. The slopes are very short, and control of runoff is not a serious problem.

Use and suitability.—This soil is well suited to all crops commonly grown in the county. All of it is cleared and used for crops. High yields of all row crops, hay, and pasture plants can be obtained if fertility is maintained. Because the areas of this soil are very narrow, many of them are used intensively in conjunction with adjacent level bottom lands.

Cumberland Series

The Cumberland series is composed of very deep, well-drained soils on high terraces. These soils developed in alluvium that seems to be mostly of limestone origin but undoubtedly contains small amounts of many other materials. These soils are characterized by dark reddish-brown silt loam to silty clay loam surface soil and dark-red clay subsoil. The relief is dominantly undulating to hilly. The slopes range from about 3 to 30 percent, but are mostly between 3 and 20 percent.

Generally, Cumberland soils lie 50 to 200 feet above the present flood plains and 800 to 950 feet above sea level. They occur extensively in a belt of high terraces that runs roughly parallel to the Tennessee and Little Tennessee Rivers and extends as much as a mile back from the present channels.

Cumberland soils are associated with Waynesboro soils, which are also on terraces. They are distinguished from the Waynesboro soils by a browner surface soil, a redder subsoil, and finer textures throughout the profile. They are very similar to the Decatur soils of the uplands but differ from them in having varying amounts of water-worn, or rounded, pebbles and cobblestones on the surface and in the soil.

Cumberland silty clay loam, eroded gently sloping phase (2 to 5 percent slopes) (CmB2) (capability unit IIe–2).—This soil is mainly on the higher parts of low, rolling hills. The areas range in size from about 1 acre to 10 acres. A description of a representative profile follows.

A_p 0 to 8 inches, dark reddish-brown (5YR 3/4) silty clay loam; weak, medium, granular structure; friable.
B_1 8 to 12 inches, dark-red (2.5YR 3/6) silty clay loam to clay loam; moderate, medium, subangular blocky structure; friable.
B_{21} 12 to 32 inches, dark-red (10R 3/6) clay; strong, fine and medium, subangular blocky structure; firm.
B_{22} 32 to 52 inches, dark-red (10R 3/6) or dusky-red (10R 3/4) clay; strong, medium, subangular blocky structure; firm.
B_{23} 52 to 70 inches, dark-red (10R 3/6) clay; strong, medium, subangular blocky structure; firm.
B_3 70 to 80 inches, dark-red (10R 3/6) clay with a few, distinct, yellowish-red variegations; moderate, medium, subangular blocky structure; firm.

The texture of the surface soil is variable. In some areas it is clay loam, and in some of the more nearly level, less eroded areas, it is loam or silt loam. The depth of the alluvial deposit is also variable, but it is generally between 3 and 10 feet. Almost all areas are underlain by limestone residuum. The depth to limestone bedrock is more than 10 feet.

This soil is moderately high in fertility and high in productivity. It is medium acid to strongly acid, moderately high in organic matter, and moderately permeable. It is fairly easy to conserve and not difficult to keep in good tilth. The water-holding capacity is high, but the water-supplying capacity is only medium because water is held in the clayey subsoil. The moderate permeability is sufficient to allow extensive root development and good circulation of air and moisture.

Use and suitability.—Practically all of this soil is used for crops, chiefly corn, small grains, and hay.

This soil is well suited to all the crops commonly grown in the county. Good yields can be obtained if moderate amounts of fertilizer are used. Crop rotations can be short, but, because of the moderate erosion hazard, it is not advisable to grow a tilled crop every year.

Cumberland silty clay loam, eroded sloping phase (5 to 12 percent slopes) (CmC2) (capability unit IIIe–2).—This is one of the most extensive soils in general soil area 6. It is on fairly short slopes below the crests of rolling hills. The areas are mostly between 1 and 10 acres in size. The present plow layer is a mixture of the original surface soil and the upper part of the subsoil and ranges from 4 to 7 inches in thickness.

This soil is medium to strong in acidity. It is moderately high in fertility, and it contains much organic matter. It is moderately permeable to roots and moisture, and its moisture-supplying capacity is about medium.

Use and suitability.—Practically all of this soil has been cleared of its original hardwood forest cover and

is now used for crops. Very little of it is idle. Corn, small grains, and hay are the principal crops. Tobacco is an important cash crop, but it is grown less extensively than on Cumberland silty clay loam, eroded gently sloping phase.

This soil is well suited to the common crops of the area. It is a little less easy to maintain than the eroded gently sloping phase and requires somewhat longer crop rotations.

Cumberland silty clay loam, severely eroded sloping phase (5 to 12 percent slopes) (CmC3) (capability unit IVe–3).—This soil is in small, scattered areas on the high terraces along the Tennessee and Little Tennessee Rivers. The present plow layer is dark-red, moderately friable, silty clay loam; all of the original surface soil and, in places, part of the subsoil has been removed by erosion. There are small, shallow gullies in some areas, but almost all of these can be obliterated by tillage. The pebbles and cobblestones that occur in a few places do not interfere with tillage.

This soil contains little organic matter. It is medium acid to strongly acid. The supply of mineral plant nutrients is moderately high. Because the plow layer is clayey, tilth is poor and the rate of infiltration is fairly slow.

Included with this soil are some areas where the profile includes notable amounts of sand. In these spots the plow layer is more like clay loam than silty clay loam.

Use and suitability.—All of this soil has been cleared and cropped. Much of it is now in unimproved pasture, mainly lespedeza and volunteer plants, or is idle. A few areas are used for cultivated crops, chiefly corn.

This soil is poorly suited to row crops. Large quantities of organic matter, lime, and mineral fertilizer are needed to increase the fertility, improve the tilth, and increase the water-absorbing and water-supplying capacity; and long rotations that consist chiefly of close-growing crops are needed to control runoff and prevent erosion.

If properly managed, this soil will give good yields of small grains, white clover, ladino clover, alfalfa, red clover, orchardgrass, timothy, and fescue. It is suited to all the common plants used for pasture and hay.

Cumberland silty clay loam, eroded moderately steep phase (12 to 20 percent slopes) (CmD2) (capability unit IVe–1).—This soil occurs in medium-sized areas on short slopes below the crests of hills. It is associated with Waynesboro, Emory, and other Cumberland soils. Its 5- or 6-inch plow layer is dark reddish-brown, friable silty clay loam, and its subsoil is dark-red, firm clay. Compared to the eroded gently sloping phase, this soil has more rapid runoff, is more eroded, and is more variable in color, depth, and texture.

This soil is moderately friable and moderately permeable. It has fair tilth and is fairly easy to work, but the strong slopes make control of runoff and of erosion difficult. The surface soil contains a moderate amount of organic matter. The reaction is medium acid to strongly acid.

Use and suitability.—Most of this soil has been cropped. About half of it is now used for tilled crops, and most of the rest is in pasture. A very small acreage is idle.

This soil is moderately well suited to tilled crops and well suited to grasses and legumes for hay or pasture. If cultivated, it needs more exacting management than the eroded gently sloping phase.

Cumberland silty clay loam, severely eroded moderately steep phase (12 to 20 percent slopes) (CmD3) (capability unit IVe–3).—This soil has a more clayey surface soil than Cumberland silty clay loam, eroded gently sloping phase. Erosion has removed almost all of the original surface soil and, in places, part of the subsoil. Some areas have shallow gullies, most of which can be crossed with heavy farm machinery and can be obliterated by tillage. The plow layer is dark-red, moderately friable silty clay loam that is plastic when wet and moderately hard when dry. The underlying material is clay. In some areas, the surface soil is more like clay loam than silty clay loam.

This soil is less fertile than the Cumberland soils that are not so severely eroded. It contains a small amount of organic matter, has a low moisture-supplying capacity, and is strongly acid. It is moderately permeable to roots, but the infiltration of water is slow enough that runoff is heavy during rains. Workability and tilth are rather poor.

Use and suitability.—All of this soil has been cleared of the native hardwood trees and used for crops and pasture. Now, a small acreage is idle. About half the acreage is in pasture, much of which is unimproved, and about a third is used for field crops, chiefly corn, small grains, and lespedeza.

This soil is better suited to close-growing crops or permanent pasture than to tilled crops. It is difficult to work and conserve, and its productivity is rather low. Corn and other cultivated crops can be grown in very long rotations, but yields are not high. If the soil is adequately fertilized and otherwise well managed, good stands of orchardgrass, white clover, ladino clover, fescue, and other pasture plants can be developed.

Cumberland silty clay loam, eroded steep phase (20 to 30 percent slopes) (CmE2) (capability unit VIe–1).—The alluvial deposit in which this soil developed is only 3 to 6 feet thick. The slopes are fairly long, and the individual areas are small to medium sized. Most of the acreage is moderately eroded. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. The uppermost 5 or 6 inches is dark reddish-brown silty clay loam, and the subsoil is dark-red firm clay.

This soil is moderately high in natural fertility. It is medium acid to strongly acid. It is difficult to conserve if used for crops, for, although it is moderately permeable, the steep slopes cause runoff to develop quickly.

Use and suitability.—Practically all of this soil is cleared. Only a few small tracts remain in native hardwood forest. Some corn and small grains are grown, but most of the acreage is used for pasture.

This soil is productive, but it is too steep to be suitable for tilled crops. It is best suited to pasture and hay. High yields of all the common pasture plants can be obtained if the soil is well fertilized and otherwise well managed.

Cumberland gravelly clay loam, eroded sloping phase (5 to 12 percent slopes) (CuC2) (capability unit

IIIe–2).—This soil is slightly coarser textured than Cumberland silty clay loam, eroded gently sloping phase. It developed in an alluvial deposit about 3 to 12 feet thick. It has gravel on the surface and in the soil. The dark reddish-brown surface layer is 4 to 8 inches thick. The subsoil is dark-red, firm gravelly clay or sandy clay. Most areas are moderately eroded, and some subsoil material has been mixed with the surface soil in tillage. Included is about 30 acres that is severely eroded and has a surface layer of gravelly clay or sandy clay.

This soil is moderately high in fertility, medium in moisture-supplying capacity, and strong in acidity. It is moderately permeable, and it is not difficult to conserve. The gravel interferes with cultivation, decreases the moisture supply, and impairs productivity.

Use and suitability.—Practically all of this soil is cleared, and most of it is used for crops or pasture. Corn, small grains, and hay predominate.

This soil is not so productive nor so responsive as Cumberland silty clay loam, eroded gently sloping phase. Nevertheless, all the crops commonly grown in the county can be grown successfully. The gravel interferes with but does not prevent tillage. Rotations of moderate length are required, for erosion is active if the soil is cultivated. The fertility is fairly high, compared with that of most other soils in the county, but liberal fertilization is required for good yields of all crops.

Cumberland gravelly clay loam, eroded moderately steep phase (12 to 20 percent slopes) (CuD2) (capability unit IVe–1).—This soil is slightly coarser textured than Cumberland silty clay loam, eroded gently sloping phase. It has gravel on the surface and in the soil. The alluvial deposits are generally between 3 and 8 feet thick. The areas are small to medium.

The surface soil ranges from dark reddish brown to dark red in color and from clay loam to loam in texture. The subsoil is dark-red gravelly clay or sandy clay. As a result of moderate to severe erosion, the present surface soil is generally a mixture of original surface soil and subsoil.

In natural fertility this soil is moderate to moderately high. In moisture-supplying capacity it is about medium. It is medium acid to strongly acid. The gravel makes tillage somewhat difficult but does not ordinarily prevent it. Because of the strong slopes, runoff is rapid, and controlling erosion is a major problem.

Use and suitability.—About 85 percent of this soil is cleared and cropped. Small acreages are used for corn and small grains, but hay and pasture are the chief uses.

All of the common crops can be grown successfully, although this soil is less productive than Cumberland soils that are almost free of gravel. Corn or other row crops, if grown in long rotations and well fertilized, will produce fair yields. Alfalfa, red clover, white clover, lespedeza, and orchardgrass are suitable pasture plants.

Cumberland and Decatur silty clay loams, severely eroded steep phases (20 to 30 percent slopes) (CrE3) (capability unit VIe–1).—These two steep soils are not shown separately on the map, because they are very similar in soil properties. About two-thirds of the acreage is Cumberland soil, which developed in old alluvium that consisted mostly of limestone materials. The remainder is Decatur soil, which developed in residuum weathered from high-grade limestone. Almost all areas are underlain by limestone bedrock at depths of 5 feet or more.

These soils are scattered sparsely in general soil areas 4 and 6. The slopes are moderately long. The surface layer is dark red, and it ranges in texture from silty clay loam to clay and clay loam. As a result of severe sheet erosion, it contains much subsoil material. The subsoil is dark-red clay.

These soils are moderately fertile, medium acid to strongly acid, and low in organic matter. Because of a clayey surface soil, tilth is poor. The moisture-supplying capacity is low. In some areas there are a few shallow gullies, but they can ordinarily be obliterated by farm implements. Controlling runoff and erosion is a dominant problem.

Use and suitability.—These soils have been cleared and cropped. They are now used mostly for unimproved pasture. Pasture is the best use for them; they are too steep to be suitable for cultivated crops. Fair to good yields of all the common pasture plants can be obtained if enough fertilizer is used and grazing is controlled.

Decatur Series

The soils of the Decatur series are very deep and well drained. They developed in residuum weathered from noncherty dolomitic limestone. They are mostly in three broad, valleylike strips, one of which passes through Greenback, one through Centersville, and one through Philadelphia. The slopes range from undulating to hilly but are dominantly rolling.

Decatur soils are similar to the associated Dewey soils but have a browner surface soil and a redder subsoil. They are also very much like Cumberland soils but occur farther from the streams and are not gravelly or sandy. On old colluvial slopes, Decatur soils are associated with Hermitage soils; along small drainageways and in depressions, they are associated with Emory soils.

Decatur soils are very important to the agriculture of the county. They are among the most productive upland soils in the county. They are medium acid to strongly acid and moderately high in natural fertility. They respond to fertilization. They are sufficiently deep and permeable to allow extensive development of roots and good circulation of air and moisture.

Decatur silty clay loam, eroded gently sloping phase (2 to 5 percent slopes) (DcB2) (capability unit IIe–2).—This soil is on fairly smooth uplands in valleys that run southwest and northeast. It is associated with other Decatur soils and with Dewey, Hermitage, and Emory soils. Most of it is in general soil area 4. The native vegetation was a deciduous forest. A description of a representative profile follows.

A_p 0 to 7 inches, dark reddish-brown (5YR 3/3) silty clay loam; moderate to strong, medium, granular structure; friable.

B_1 7 to 14 inches, dark reddish-brown (2.5YR 3/4) silty clay loam or silty clay; moderate, fine, subangular blocky structure; moderately firm.

B_{21} 14 to 20 inches, dark-red (2.5YR 3/6) clay; strong, medium, subangular blocky structure; firm.

B_{22} 20 to 46 inches, dark-red (10R 3/6) clay; strong, medium, subangular blocky structure; firm.

B_3 46 to 60 inches, red to dark-red (2.5YR 4/6 to 3/6) clay; strong, medium, subangular blocky structure; a few brownish-yellow variegations that are more numerous in lower part; a few fine chert fragments.

The depth to the limestone bedrock ranges from 6 to 20 feet. Some areas are less severely eroded than the representative profile and have a thicker surface soil that is more like silt loam than silty clay loam. Included are a few spots that have a surface soil of dark-red, firm silty clay.

This soil is moderately high in natural fertility. Its surface layer contains a moderate amount of organic matter. Internal drainage is moderate, but the firm subsoil retards the rate at which moisture is absorbed. Consequently, runoff accumulates rather quickly during rains. The moisture-supplying capacity is medium; it is less than that of Emory, Hermitage, and other soils on the local alluvial slopes.

Use and suitability.—All of this soil has been cleared and cultivated, and a large part is now used for crops. Corn, lespedeza, and alfalfa predominate, but small grains and pasture are important. Some acreage is used for tobacco and vegetables.

This is one of the best soils in the county for crops and pasture. It is especially well suited to general farm crops, including alfalfa, red clover, orchardgrass, and other exacting legumes and grasses. It responds well to fertilization and management.

Decatur silty clay loam, eroded sloping phase (5 to 12 percent slopes) (DcC2) (capability unit IIIe–2).—This soil contains slightly more clay than Decatur silty clay loam, eroded gently sloping phase, is slightly shallower, and has more spots that are severely eroded. The 4- to 5-inch surface layer is dark reddish-brown, moderately friable silty clay loam. To a depth of about 40 inches, the subsoil is dark-red, firm clay. The depth to the limestone bedrock ranges from 5 to 18 feet.

This soil is fertile. Except in the severely eroded spots, it is fairly high in organic matter. It is medium acid to strongly acid. Internal drainage is moderate, but the firm subsoil retards percolation. This soil is permeable enough, however, to allow normal development of roots. The moisture-supplying capacity is only medium, because much of the water absorbed is unavailable to plants.

Use and suitability.—All of this soil has been cleared and cropped. About 20 percent is in permanent pasture; the rest is used for crops, mainly corn, alfalfa, red clover, oats, wheat, and other small grains.

This soil is well suited to general crops. It is especially well suited to alfalfa, red clover, and other of the more exacting legumes and grasses. It is less well suited to truck crops. The tobacco grown on this soil is probably not of such high quality as that grown on some of the well-drained, lighter colored soils.

Decatur silty clay loam, severely eroded sloping phase (5 to 12 percent slopes) (DcC3) (capability unit IVe–3).—This soil has lost almost all of its original surface soil and, in places, part of its subsoil. Some shallow gullies have formed. The plow layer is red to dark-red, firm silty clay loam. The soil beneath it is similar, except that it is lighter colored below a depth of 36 inches. The limestone bedrock occurs at depths of 3 to 15 feet.

Most of this soil is in small tracts associated with areas of less severely eroded Decatur soils. Almost all of it is in general soil area 4.

This soil is low in organic matter and plant nutrients, but it responds fairly well to fertilizers. It is medium acid to strongly acid. The plow layer has poor tilth. Moisture infiltrates rather slowly, but the soil is fairly permeable to roots. The risk of further erosion is high in cultivated areas.

Use and suitability.—All of this soil has been cropped. Much of it is now used for pasture; a small acreage is in hay and corn. Yields are low.

If this soil is properly fertilized and limed, it can be used for crops in long rotations. It is too droughty for shallow-rooted plants, but it is suited to small grains and legume-and-grass hay. Alfalfa, red clover, orchardgrass, timothy, and other exacting legumes and grasses can be grown. If well managed, this soil will produce good pasture yields.

Decatur silty clay loam, eroded moderately steep phase (12 to 20 percent slopes) (DcD2) (capability unit IVe–1).—Almost all of this soil is in general soil area 4. Much of it is in small strips on short, strong slopes below areas of less steep Decatur and Dewey soils. The surface layer consists of a mixture of subsoil and original surface soil. It is dark reddish-brown, friable silty clay loam. To a depth of about 40 inches, the subsoil is dark-red, firm clay. Next below is a layer of dark-red, firm to very firm silty clay or clay that is slightly lighter colored. The depth to the limestone bedrock ranges from 4 to 13 feet. Included are small spots in which the plow layer consists of subsoil.

This soil is fertile. Except where erosion has removed most of the surface layer, it contains a moderate amount of organic matter. It is medium acid to strongly acid. Permeability to roots is moderate. Runoff develops quickly because of the firm subsoil and the strong slopes. The moisture-supplying capacity is medium.

Use and suitability.—Nearly all of this soil has been cropped. Much of it is now used for pasture, but some is used for general crops, principally alfalfa and small grains.

Although it is not suited to intensive use, this soil is well suited to legumes, grasses, and small grains. It can be used for corn or other row crops in long rotations.

Decatur silty clay, severely eroded moderately steep phase (12 to 20 percent slopes) (DcD3) (capability unit IVe–3).—This soil has lost almost all of the original surface soil and, in places, part of the subsoil. The plow layer is dark-red, firm silty clay. The soil beneath is similar, except that it becomes lighter red with depth. The limestone bedrock occurs at depths of 3 to 12 feet. Most of the gullies that have formed can be obliterated by deep tillage or by filling.

This soil contains small amounts of organic matter and plant nutrients. It has poor tilth. Moisture percolates slowly, and the moisture-supplying capacity is low.

Use and suitability.—All of this soil has been cropped. A small acreage is used for small grains and corn, but more is used for pasture. Yields are low.

This soil is poorly suited to row crops. If properly fertilized and limed, it will support legume-and-grass

pastures of high quality. The pastures, however, are quickly damaged by dry weather.

Dewey Series

The soils of the Dewey series are very deep, well drained, and productive. They developed on uplands in residuum weathered from noncherty dolomitic limestone. They are in valleylike belts of rolling hills and are scattered throughout the parts of the county that are underlain by dolomitic limestone. Large acreages are in general soil areas 2 and 4. The slopes range from undulating to steep.

Normally, Dewey soils have a surface soil of brown to dark-brown silt loam and a subsoil of red, firm clay. The Dewey soils in Loudon County, for the most part, are moderately sheet eroded and now have a surface soil of silty clay loam.

Dewey soils are associated with Decatur, Fullerton, Hermitage, and Emory soils. They are similar to the Decatur soils, except that they are less brown in the surface soil and less red in the subsoil and are slightly cherty. The Fullerton soils are more cherty than the Dewey soils and much lighter colored throughout.

Dewey soils are important to the agriculture of Loudon County. They are moderately fertile and medium to strongly acid. They are permeable enough for extensive development of roots and for good aeration. They contain very small amounts of fine chert, but not enough to affect workability or productivity.

Dewey silty clay loam, eroded gently sloping phase (2 to 5 percent slopes) (DeB2) (capability unit IIe–2).—This soil is scattered throughout general soil areas 2 and 4. Most of it is in small and medium-sized areas on the rounded crests of low hills. Steeper phases of Dewey soils are on the slopes below it. Most of the acreage is moderately eroded, and the present surface layer is partly subsoil material brought up by tillage. The original surface soil was dark-brown silt loam about 8 to 9 inches thick, and there are a few spots where most of it still remains. A description of a representative profile follows.

- A_p 0 to 7 inches, brown to dark-brown (10YR 4/3) silty clay loam; moderate, medium, granular structure; friable.
- B_1 7 to 11 inches, yellowish-red (5YR 4/6) silty clay loam; moderate and strong, fine, subangular blocky structure; friable.
- B_{21} 11 to 17 inches, red (2.5YR 4/6) silty clay or clay; moderate to strong, medium, subangular blocky structure; firm.
- B_{22} 17 to 44 inches, red (2.5YR 4/6) clay; strong, medium, subangular blocky structure; firm.
- B_3 44 to 60 inches, red (2.5YR 4/6) or yellowish-red (5YR 4/6) clay or silty clay; structure less distinct than in layer above, and individual aggregates larger; firm; few yellowish-brown variegations, more numerous in lower portion; few finely divided chert fragments.

The depth to the limestone bedrock ranges from 7 to 20 feet. In a few spots the red, firm subsoil is exposed. The surface layer has a reddish tinge in places.

Included are a few areas in which the surface soil is almost like loam. In these areas the profile is somewhat sandy and the bedrock is probably sandy limestone or limestone that contains thin lenses of sand. Because of the intricate pattern of distribution, it was not practical to show these areas separately on the soil map.

This soil contains a moderate amount of organic matter. It has good internal drainage, but infiltration of water is somewhat impeded by the firm clayey subsoil. Permeability to roots is moderate, and the moisture-supplying capacity is medium. Large quantities of water are absorbed, but, apparently because this soil is clayey, much of the water is tightly held and is unavailable to plants.

Use and suitability.—Nearly all of this soil has been cropped for many years. About 35 or 40 percent is now used for crops, chiefly corn and small grains; 35 percent is used for hay, mainly lespedeza, alfalfa, and timothy; 20 percent is used for pasture; and the rest is idle or in native hardwood forest.

This soil is well suited to tobacco and truck crops and to other crops commonly grown in the county. It responds well to fertilization and other good management practices.

Dewey silty clay loam, eroded sloping phase (5 to 12 percent slopes) (DeC2) (capability unit IIIe–2).—This soil is scattered throughout the limestone valleys. It has lost slightly more of its original surface soil than the eroded gently sloping phase, has slightly more subsoil material mixed in the plow layer, and has more small spots where the red clay subsoil is exposed.

The plow layer of this soil is now brown to reddish-brown, moderately friable silty clay loam. The subsoil is red, firm silty clay or clay. The material below depths of 35 to 40 inches is red, firm clay or silty clay streaked or variegated with yellowish brown and brownish yellow. Many areas have small amounts of fine chert fragments throughout the profile, mostly in the lower part of the subsoil. The limestone bedrock is at depths of 7 to 18 feet.

Included is a small acreage in which the profile is sandy throughout and the surface soil is almost like loam in texture. This inclusion probably developed from sandy limestone or from limestone that had thin lenses of sandstone.

This soil contains a moderate amount of organic matter. It is medium acid to strongly acid. It is moderately permeable to roots, but the heavy subsoil retards the percolation of water, and runoff develops quickly during heavy rains. Erosion is likely in cultivated areas. Apparently, large quantities of water are absorbed, but much of it is held tightly by the soil and is difficult for plants to obtain. Tilth is good, and workability is generally good.

Use and suitability.—Almost all of this soil has been cropped. Corn, hay, and small grains are the main crops. About 25 percent of the acreage is used for pasture; a small acreage is in tobacco.

This is one of the best soils in the county for crops, but it needs more exacting management than Dewey silty clay loam, eroded gently sloping phase. If adequately fertilized, it will produce good yields of alfalfa, red clover, white clover, ladino clover, orchardgrass, timothy, and bluegrass. It is well suited to all row crops, but it should not be tilled more often than once in 3 years.

Dewey silty clay loam, eroded moderately steep phase (12 to 20 percent slopes) (DeD2) (capability unit IVe–1).—This soil is widely distributed in general soil

areas 2 and 4. Much of it lies in narrow strips on strong slopes in the upland parts of the valleys. It is a little more eroded than the eroded gently sloping phase. The plow layer now consists of brown or reddish-brown silty clay loam, and the layer beneath, of red, firm silty clay to clay. Below a depth of about 30 inches is a layer of lighter red silty clay or clay streaked and splotched with yellow. The limestone bedrock occurs at depths of 5 to 16 feet. Many areas have a little fine chert throughout the profile, mostly in the lower subsoil.

A few areas of this soil have a small amount of fine sand in the profile, mostly in the surface soil. These areas probably developed on limestone that contained lenses of sandstone. Some small exposed spots have lost all the original surface soil and now have a plow layer of red, firm silty clay. In a few areas that are still under hardwood forest, the surface soil is dark-brown silt loam about 8 inches thick.

This soil is medium acid to strongly acid. Except where it is most severely eroded, it is moderately fertile and contains a moderate amount of organic matter. The surface soil is permeable to moisture, but the subsoil retards percolation slightly. The soil properties are favorable for the development of roots.

Use and suitability.—Most of this soil has been cultivated. Much of it is now used for hay and pasture.

This soil is of limited use for cultivated crops because it is erodible. It can be used in long rotations that consist mostly of small grains, hay, and pasture. Corn and other row crops grow well, but the soil should not be tilled more often than once in every 4 or 5 years. Yields of all of the common hay and pasture plants are good.

Dewey silty clay loam, eroded steep phase (20 to 30 percent slopes) (DeE2) (capability unit VIe–1).—This soil has moderately long slopes. It is similar to the eroded gently sloping phase, but it is more eroded and not so deep.

The surface layer of this soil is brown to reddish-brown silty clay loam about 5 inches thick. The subsoil is red, firm clay. The material below a depth of about 30 inches is lighter colored and variegated with yellowish brown. The depth to the limestone bedrock is between 5 and 12 feet. Some areas have a little fine chert throughout the profile, mostly in the lower part of the subsoil. There are small spots where the red subsoil is exposed and the surface layer is silty clay. Small acreages remain in native hardwood forest and have a surface soil of dark-brown silt loam about 8 inches thick.

A few areas of this soil appear to have developed on sandy limestone or on limestone that contained thin lenses of sandstone. These areas have small amounts of fine sand in the profile, particularly in the surface soil, and the texture is loam to clay loam.

This soil is moderately fertile and medium acid or strongly acid. It has a fair amount of organic matter. The moisture-supplying capacity is medium. Permeability is sufficient for extensive root development. Because of the clayey subsoil and the steep slopes, runoff develops quickly.

Use and suitability.—About 90 percent of this soil has been cleared and cropped. Most of it is now used for pasture, but a little is used for corn, small grains, and hay.

This soil is too steep and erosive for tilled crops, but it is well suited to all of the common pasture plants. If well fertilized, it produces good yields of legumes and grasses.

Dewey silty clay, severely eroded sloping phase (5 to 12 percent slopes) (DwC3) (capability unit IVe–3).—This soil is in small, scattered areas on limestone uplands. The plow layer is red or yellowish-red, firm silty clay. It is underlain by similar material that contains some fine chert fragments and grades with depth to a lighter red. The limestone bedrock occurs at depths of 5 to 16 feet. All or practically all of the original surface soil has been removed by severe sheet erosion. Shallow gullies have formed in some areas, but they can be obliterated by deep tillage.

This soil is not fertile. It is strongly acid, and it contains little organic matter. The tilth of the plow layer is very poor. Absorption of water is slow, and the water-supplying capacity is low. Runoff develops quickly.

Use and suitability.—All of this soil has been cropped. Now, much of it is in unimproved pasture, some is idle, and some is used for crops, chiefly small grains, corn, and hay.

If well managed, this soil is fairly well suited to crops and pasture. Because it is droughty, it is not suited to late-maturing crops. For much of it, permanent pasture is probably the best use. If the fertility is raised to a moderately high level, alfalfa and other deep-rooted legumes can be grown. Small grains will grow better than corn. There is too little moisture for tobacco and vegetables during dry weather.

Dewey silty clay, severely eroded moderately steep phase (12 to 20 percent slopes) (DwD3) (capability unit IVe–3).—This soil is widely distributed throughout general soil areas 2 and 4. It was once Dewey silt loam, moderately steep phase, but erosion has removed almost all of the original surface soil and, in places, part of the subsoil.

This soil now has a plow layer of yellowish-red or red, firm silty clay. The upper part of the subsoil is similar to the plow layer. Below a depth of about 30 inches, lighter red silty clay is streaked or splotched with yellow. The limestone bedrock occurs at depths of 4 to 15 feet. In many places, the profile, particularly the lower part of the subsoil, contains a little fine chert. Most of the shallow gullies that have formed can be obliterated by deep tillage or by filling.

This soil is not fertile. It contains little organic matter, and it is strongly acid. Roots penetrate fairly well, but moisture infiltrates slowly and percolates slowly. The moisture-supplying capacity is low. Tilth is poor.

Use and suitability.—All of this soil has been cropped. Some of it is now idle, much is in unimproved pasture, and some is in improved pasture. Small grains, corn, and lespedeza are the chief crops.

This soil is rather poorly suited to tilled crops. It is too droughty for corn or tobacco. If properly fertilized and limed, it will support good pastures of legumes and grasses. All of the common hay and pasture plants can be successfully grown. Small grains will produce good yields because they grow during the part of the year when moisture is most plentiful.

Dewey silty clay, severely eroded steep phase (20 to 30 percent slopes) (DwE3) (capability unit VIe–1).—This soil has lost all or almost all of its original surface soil. The present surface soil, which is mostly former subsoil material, is red, firm silty clay. The subsoil is very similar to the surface soil, but is more clayey. Shallow gullies have formed in some areas, but they can generally be erased by deep tillage. The depth to the limestone bedrock ranges from 4 to 12 feet.

This soil is less fertile than the less eroded phases of the Dewey soils. Because of the clayey surface soil and the steep slopes, runoff is rapid and the moisture-supplying capacity is low. The subsoil is fairly favorable for penetration of roots, but the somewhat poor tilth of the clayey surface soil makes it difficult, in many places, to establish plants.

Use and suitability.—All of this soil is cleared. Most of it is in unimproved pasture. Some areas are idle. This soil is poorly suited to cultivated crops. It is best suited to pasture or forest. If well fertilized and protected from overgrazing, it will produce fair to good yields of alfalfa, orchardgrass, whiteclover, fescue, sericea lespedeza, and other common pasture plants.

Emory Series

The soils of the Emory series are deep, well drained, and highly productive. They formed from recent colluvium or local alluvium that washed or rolled chiefly from Decatur, Dewey, Cumberland, and other soils of the limestone uplands. They normally occur in small, widely distributed areas along intermittent drainageways, in depressions, and at the base of upland slopes. Most of the acreage is in general soil areas 2, 4, and 6. The relief is mostly nearly level, but it ranges to gently sloping. The slope gradients generally are between 1 and 3 percent.

Almost all areas of these soils are underlain, at depths of more than 40 inches, by limestone residuum. The depth to the bedrock is about 5 to 20 feet. In some areas, especially on the floors of sinks and in the lower parts of areas next to drainageways, the material below depths of 30 to 36 inches has some grayish and yellowish mottles. Some areas have received more recent depositions of subsoil material washed from the adjacent upland slopes.

Emory soils are distinguished chiefly by their dark-brown or dark reddish-brown color and lack of profile development. There is little or no differentiation in the profile to a depth of 30 or 40 inches.

Emory soils lie adjacent to Hermitage soils in many places. The two soils consist of the same kind of materials, but they are fairly easy to separate because the Hermitage soils are older and have well-defined soil layers. Emory soils are similar to Greendale soils in position and age, but the Emory soils are much browner throughout.

In general, Emory soils are high in natural fertility. They are medium acid to strongly acid. They contain much organic matter. Because of their moderate permeability and low position, they have a very high moisture-supplying capacity. They are easy to manage and conserve.

Emory silt loam (1 to 3 percent slopes) (Em) (capability unit I–1).—This soil is important to the farming of the area. A description of a representative profile follows.

0 to 10 inches, dark reddish-brown to dark-brown (5YR 3/3 to 7.5YR 3/2) silt loam; weak, medium, granular structure; very friable.
10 to 18 inches, dark reddish-brown to dark-brown (5YR 3/3 to 7.5YR 3/2) silt loam; moderate, medium, granular structure; friable.
18 to 40 inches, dark reddish-brown to dark-brown (5YR 3/3 to 7.5YR 3/2) silt loam; moderate, medium, granular structure; friable.

The lowest layer is silty clay loam in some places.

Use and suitability.—Almost all of this soil is cultivated, much of it to tobacco, corn, and other row crops. Some truck crops are grown. Small grains and hay crops are commonly grown. Yields are high. Very little of the acreage is idle. Some of the small, irregularly shaped areas are farmed with the adjacent upland soils because it is not feasible to farm them as separate fields or units.

This soil is suited to rather intensive use. It is one of the most fertile soils in the county. It is well suited to tobacco and truck crops. If the fertility is maintained, high yields of all the crops commonly grown in the county can be expected.

Emory silty clay loam (1 to 3 percent slopes) (Er) (capability unit I–1).—This soil is in narrow strips along intermittent drainageways, on fans along the lateral drains that empty onto the flood plains, and in small, saucerlike depressions. It developed where the parent material was derived mostly from Talbott soils and where recent deposits of subsoil material washed from adjoining slopes cover the older alluvium or colluvium.

This soil is somewhat lighter colored than the other Emory soils. Its surface soil is brown, dark-brown, or dark yellowish-brown, moderately friable silty clay loam about 15 inches thick. The underlying material is moderately friable silty clay loam and is somewhat lighter colored than the layer above. Below depths of 26 to 30 inches, the material has grayish and yellowish mottles. In places where an old surface layer has been buried by recent overwash, the upper part of the soil is reddish-brown or red silty clay loam. The depth to the limestone bedrock is generally 5 to 10 feet. Little of this soil is subject to erosion.

Use and suitability.—This soil is somewhat less fertile than Emory silt loam, but it is more fertile than the surrounding upland soils, and it contains more organic matter. It remains moist during most of the growing season. The reaction is medium acid to strongly acid.

Nearly all of this soil is used for field crops, to which it is well suited. It is suitable for use in short rotations, and it can be used rather intensively for corn, tobacco, and vegetables if the fertility is maintained. Small grains, however, are likely to lodge because of the exceptionally high moisture content and the high fertility. The common grasses and legumes grow luxuriantly.

Etowah Series

The soils of the Etowah series are very deep and well drained. They are in small and medium-sized areas, mainly on low terraces along the Tennessee and Little Tennessee Rivers. They formed in old alluvial material,

presumably derived from limestone, that lies about 25 to 50 feet above the present flood plains. The relief is mostly gently sloping and rolling, but a few short slopes are moderately steep.

Etowah soils are characterized by a surface soil of dark-brown silt loam and a subsoil of yellowish-red to reddish-brown silty clay loam. They are highly productive and are important to farming in the county.

Normally, Etowah soils are between Cumberland and Waynesboro soils, which occupy older, higher terraces, and Sequatchie soils, which are on low terraces. They are lighter colored than the Cumberland soils and have a less clayey subsoil.

The natural fertility of these soils is high. They are moderately high in organic matter. They are medium acid to strongly acid. Generally free of gravel or stones, they are easy to work and conserve. They are moderately permeable. The moisture-supplying capacity varies somewhat with the slope gradient, but it is generally high.

Etowah silt loam, gently sloping phase (2 to 5 percent slopes) (EtB) (capability unit IIe–1).—This soil is characterized by gentle slopes and a fairly thick surface soil of silt loam. Most of it is in general soil area 6. A few areas are along some of the larger creeks of the county, mostly on small remnants of terraces. A description of a representative profile follows.

- A_p 0 to 8 inches, dark-brown (10YR 3/3) silt loam; moderate, medium, granular structure; very friable.
- B_1 8 to 20 inches, reddish-brown (5YR 4/4) or yellowish-red (5YR 4/6) silty clay loam; moderate, fine and medium, subangular blocky structure; friable.
- B_2 20 to 45 inches, yellowish-red (5YR 4/6) silty clay loam; moderate, fine and medium, subangular blocky structure; friable; ranges to red and reddish brown in some areas.
- B_3 45 to 60 inches, red (2.5YR 4/6) silty clay loam; weak, medium, subangular blocky structure; friable; grades into limestone residuum, generally at depths of at least 5 or 6 feet.

The depth to the limestone bedrock ranges from 5 to 20 feet. The areas along the Little Tennessee River commonly have small amounts of mica flakes in the profile. In some areas there are a few rounded pebbles, but not enough to affect productivity or workability. The moisture-supplying capacity is high.

Use and suitability.—This soil is used almost entirely for crops. It is suited to many different crops, including alfalfa, tobacco, and vegetables. It produces high yields if well fertilized and otherwise well managed. Since it is fairly easy to conserve, rotations can be short.

Etowah silt loam, eroded sloping phase (5 to 12 percent slopes) (EtC2) (capability unit IIIe–1).—This soil has lost part of its original surface soil, and its plow layer is now partly subsoil material. The plow layer is dark-brown silt loam about 4 to 6 inches thick, and the subsoil is yellowish-red to reddish-brown, moderately firm silty clay loam. The bedrock, generally limestone, is at depths of 5 to 15 feet.

This soil is fertile. It requires more care to control runoff than does the uneroded gently sloping phase. Its moisture-supplying capacity is high.

Use and suitability.—Nearly all of this soil has been cropped. Most of it is used for corn, small grains, and hay.

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Good stands of legumes and grasses can be developed if enough fertilizer and lime are used. All of the common plants can be grown.

Etowah silt loam, eroded moderately steep phase (12 to 20 percent slopes) (EtD2) (capability unit IVe–1).—Most of this soil is on very short slopes on intermediate terraces along the Tennessee and Little Tennessee Rivers. It is similar to the gently sloping phase, except that the plow layer contains some subsoil material as a result of moderate sheet erosion. The surface layer is dark-brown silt loam and is 4 to 7 inches thick. The subsoil is reddish-brown or yellowish-red silty clay loam. The depth to bedrock, which is limestone in most places, is between 5 and 12 feet. In some small spots, the surface layer is reddish-brown silty clay loam.

This soil is moderately fertile. It has medium moisture-supplying capacity. It will erode if cultivated, but this hazard is somewhat alleviated by the short slopes. Except in the most eroded spots, tilth is good and fairly easy to maintain.

Use and suitability.—This soil is now used for the crops commonly grown in the county: corn, small grains, and hay. Very little is in forest, and very little is in permanent pasture or is idle.

All of the common plants grow well. However, tilled crops should be grown only in long rotations because the slopes are strong and the soil will erode. If the fertility is maintained by applying complete fertilizers and lime, good yields of all crops can be obtained.

Farragut Series

The Farragut series consists of moderately deep to deep, well-drained soils on uplands. The parent material was residuum weathered from interbedded limestone and shale or from limestone that contained lenses of shale. In some places, the parent rock appears to have been a thin layer of limestone overlying shale.

These soils are mostly in general soil area 5, in the southern part of the county. Some areas are in general soil area 3. The individual areas are small or medium sized. Much of the acreage is in valleylike belts that outline higher ridges occupied by Tellico soils. The slopes range from undulating to steep but are dominantly rolling and hilly.

Farragut soils are characterized by a surface soil of reddish-brown silty clay loam and a subsoil of red or yellowish-red, very firm silty clay. In the upper 20 inches, they resemble Decatur soils, but they are shallower than Decatur soils and are slightly lighter colored, especially in the subsoil. They are deeper and redder than Sequoia soils.

These soils are moderately fertile and strongly acid. The subsoil is permeable to roots, but water infiltrates rather slowly, and runoff is high even on moderate slopes.

Farragut silty clay loam, eroded gently sloping phase (2 to 5 percent slopes) (FaB2) (capability unit IIe–2).—Most of this soil is on the broad crests of low, linear hills and ridges. It is closely associated with Litz, Sequoia, and Tellico soils and with more strongly sloping Farragut soils. A description of a representative profile follows.

A_p 0 to 7 inches, reddish-brown (5YR 4/3) silty clay loam; strong, medium, granular structure; friable.
B_1 7 to 14 inches, reddish-brown (5YR 4/4) silty clay or fine silty clay loam; strong, medium, subangular blocky structure; firm.
B_2 14 to 28 inches, red (2.5YR 4/6) silty clay or clay; strong, coarse and medium, subangular blocky structure; very firm.
B_3 28 to 42 inches, red, firm clay or silty clay; moderate, coarse, subangular blocky structure; a few, small, brownish-yellow shale fragments, soft and well leached; number of fragments increases with depth.
C_1 42 to 54 inches, yellowish-red (5YR 5/6) silty clay; moderate, coarse, subangular blocky structure; very firm; common small fragments of weathered shale.

The color and texture of the surface layer varies from place to place, depending on the amount of material lost through erosion. Over most of the acreage, the plow layer consists of a mixture of original surface soil and subsoil. In a few spots, all of the original surface soil has been removed, and the plow layer is reddish silty clay. In most places, the depth to bedrock is 3 to 6 feet. In a few places, it is only 30 to 36 inches.

This is a moderately productive soil. It contains a moderate amount of organic matter. Permeability is moderately slow, and the moisture-supplying capacity is medium. Tilth is moderately favorable, but this soil is likely to puddle and clod if it is cultivated when wet. There are almost no stones, except for a few outcrops of limestone in some areas.

Use and suitability.—Nearly all of this soil is used for crops. It is well suited to corn, small grains, legume-and-grass hay, pasture, and other common crops. If well managed, it can be used for a 2- to 3-year rotation, but it is not suited to more intensive cropping. It is especially well suited to alfalfa and other legumes. Yields are fairly high if enough fertilizer is applied.

Farragut silty clay loam, eroded sloping phase (5 to 12 percent slopes) (FaC2) (capability unit IIIe–2).—This soil has lost more material through erosion than has the eroded gently sloping phase; consequently, it has a slightly more clayey plow layer that is only moderately friable. The underlying material is predominantly red, very firm clay or silty clay. The shale and limestone bedrock is at depths of 3 to 6 feet.

This soil responds well to fertilization and other good management. Roots penetrate the entire depth of the soil, but because water percolates through the heavy subsoil rather slowly and because the slopes are moderately strong, runoff and erosion are likely to occur. The subsoil absorbs a large amount of water but holds it so tightly that much of it is not available to plants. The tilth of the plow layer is fairly good, but the soil can be tilled only within a narrow range of moisture content.

Use and suitability.—All of this soil has been cropped. Much of it is now in corn, small grains, and lespedeza; some is in grass-and-legume pasture; and a small acreage is idle.

This soil is well suited to all the crops commonly grown in the county. It is very well suited to all pasture and hay plants. If it is adequately fertilized, it gives good yields of high-quality hay and pasture. Tilled crops should be grown only in moderately long rotations that consist mostly of close-growing grasses and legumes.

Farragut silty clay loam, eroded moderately steep phase (12 to 20 percent slopes) (FaD2) (capability unit IVe–1).—This soil is similar to the eroded gently sloping phase, but it is slightly more eroded. The areas are small to medium sized and occur on moderately short slopes of low hills and ridges. Most of the acreage is in valleylike belts that border areas of Tellico soils. The present surface layer, which is a mixture of the original silt loam surface soil and the upper part of the silty clay subsoil, is reddish-brown, moderately friable silty clay loam. The subsoil is red, very firm silty clay or clay. Most of the acreage is moderately eroded, but in a few scattered small spots the red, clayey subsoil is exposed.

Included is about 50 acres that has slopes of 20 to 30 percent.

The natural fertility is moderate, but the most severely eroded spots are low in fertility. The reaction is strongly acid. The firm subsoil allows fairly good development of roots, but water infiltrates rather slowly, and runoff is rapid. The capacity to supply water to plants is low to medium. The erosion hazard is serious, and control of water is a major problem.

Use and suitability.—About one-third of this soil is used for crops, mainly corn, small grains, and hay. Most of the remainder is in unimproved pasture, about 15 percent is still in hardwood forest, and some is idle.

All of the common crops can be grown. Because of the erosion hazard, tilled crops should be grown only in 5- or 6-year rotations. The moisture supply is more adequate in the early part of the growing season than in the latter part; consequently, small grains, hay, and pasture are better suited than late-maturing row crops. Tobacco and vegetables are poorly suited.

Farragut silty clay, severely eroded sloping phase (5 to 12 percent slopes) (FbC3) (capability unit IVe–3).—Nearly all of the original surface layer of this soil has been removed by erosion. Outcrops of limestone occur in a few places. The shale and limestone bedrock is 2½ to 5 feet below the surface. The plow layer is red to reddish-brown, firm silty clay. The underlying material is red to yellowish-red, firm clay or silty clay. Small, soft fragments of shale normally occur below depths of 25 to 30 inches.

This soil is low in fertility. It contains little organic matter. It has moderately slow permeability and is droughty during dry periods. Its capacity to supply moisture is low. Because the surface layer contains much clay, tilth is poor and is difficult to maintain.

Use and suitability.—All of this soil has been cleared. Much of it is now in unimproved pasture or is idle; about 15 percent is in corn and small grains; several small areas have reverted to pine forest.

This soil is poorly suited to tilled crops. It is highly susceptible to further erosion. If it is adequately fertilized and otherwise well managed, it can be used for grasses and legumes, including alfalfa, red clover, white clover, orchardgrass, fescue, and lespedeza. Growing close-growing crops for a long time would increase the supply of organic matter and improve the tilth and the moisture-supplying capacity; then the soil could probably be used for tilled crops in long rotations.

Farragut silty clay, severely eroded moderately steep phase (12 to 20 percent slopes) (FbD3) (capability unit IVe–3).—This soil is on short slopes in the uplands.

It is associated with Litz, Sequoia, and Tellico soils. The areas are small or medium sized. Erosion has removed all of the original surface soil. The present surface layer, which is mainly subsoil material, is red or reddish-brown, firm silty clay. The subsoil is similar to the surface soil but grades to yellowish-red silty clay or clay at depths of about 25 to 30 inches. The depth to bedrock ranges from 2½ to 5 feet. Shallow gullies have formed in some areas, but most of them can be obliterated by ordinary farm implements or deep tillage.

This soil is low in fertility. The tilth is poor. The moisture-supplying capacity is low. A major limitation is the severe erosion hazard.

Use and suitability.—All of this soil has been cleared. Much of it is now in pasture that consists chiefly of lespedeza and volunteer plants. A small part is used for corn, small grains, and hay crops. About 10 to 15 percent is idle.

If well fertilized and otherwise well managed, this soil gives moderate yields of small grains and the common hay and pasture plants. Row crops should be grown only in very long rotations—5 or 6 years—and high yields cannot be expected. Corn, tobacco, and other vegetables and row crops do not yield well. They wilt during even short dry periods.

Farragut silty clay, severely eroded steep phase (20 to 30 percent slopes) (FbE3) (capability unit VIe–1).—This soil is on fairly short slopes, with Tellico and Sequoia soils. Erosion has removed almost all of its surface soil. The present surface layer, which consists mainly of subsoil material, is red or reddish-brown, firm silty clay. The subsoil is similar but grades to yellowish red at depths of 20 to 25 inches. The depth to the shaly bedrock ranges from 2 to 5 feet.

The fertility is low. The steep slopes and clayey surface soil cause rapid runoff and loss of water needed by crops. Special practices are required to control water and prevent erosion.

Use and suitability.—Most of this soil is in unimproved pasture; a few areas are in forest of Virginia pine; and some is idle.

This soil is poorly suited to tilled crops because of its steep slopes and fine-textured surface soil. It is best suited to permanent pasture or forest. It will produce fair to good yields of orchardgrass, fescue, alfalfa, sericea lespedeza, and similar plants if it is well fertilized and otherwise well managed. It is too droughty to produce good yields of ladino clover.

Fullerton Series

The Fullerton series consists of deep, well-drained soils that are locally called "gravelly ridge land." These soils developed on broad, rounded hills and ridges in residuum weathered from cherty dolomitic limestone. The slopes range from gentle to very steep. Except for narrow areas in the valleys, a large part of the northern two-thirds of the county consists of Fullerton soils. The largest belt crosses the county just south of Loudon.

Where uneroded, Fullerton soils have a surface soil of yellowish-brown silt loam or cherty silt loam, and a subsoil of yellowish-red to red clay or cherty clay. A little more than half the acreage has chert in quantities that interfere with cultivation and decrease productivity. The rest has small amounts of chert fragments but not enough to interfere materially with farming.

Fullerton soils occur with Clarksville and Dewey soils. They are less cherty than Clarksville soils and have a red rather than a yellow subsoil. They are lighter colored than Dewey soils, more cherty, and less productive. Other associated soils are Minvale, Landisburg, and Greendale soils, which are on colluvial lands, and Huntington, Lindside, Lobelville, and Melvin soils, which are on first bottoms.

These soils are low in fertility. They are very strongly acid. They contain little organic matter. They are permeable enough to permit extensive penetration by roots.

Fullerton cherty silt loam, sloping phase (5 to 12 percent slopes) (FcC) (capability unit IIIe–3).—This soil is mainly on the tops of hills and ridges, in tracts of 2 to 15 acres. It is cherty and highly leached. A description of a representative profile follows.

- A_1 0 to 1 inch, dark grayish-brown (2.5Y 4/2) cherty silt loam; weak, medium, crumb structure; very friable.
- A_2 1 to 9 inches, yellowish-brown (10YR 5/4) or light yellowish-brown (10YR 6/4) cherty silt loam; weak, medium and fine, granular structure; very friable.
- A_3 9 to 14 inches, yellowish-brown (10YR 5/6) cherty silt loam; moderate, medium, granular structure; friable.
- B_1 14 to 20 inches, strong-brown (7.5YR 5/8) cherty silty clay loam; moderate, fine and medium, subangular blocky structure; friable.
- B_{21} 20 to 25 inches, yellowish-red (5YR 5/8) cherty silty clay loam; moderate, medium, subangular blocky structure; firm.
- B_{22} 25 to 38 inches, yellowish-red (5YR 5/8) or red (2.5YR 4/6) cherty clay; moderate to strong, medium, subangular blocky structure; firm.
- B_3 38 to 50 inches, yellowish-red (5YR 5/8) or red (2.5YR 4/6) cherty clay; a few brownish-yellow variegations; moderate, medium, subangular blocky structure; firm.
- C_1 50 to 70 inches, variegated red (2.5YR 4/6), strong-brown (7.5YR 5/8), and brownish-yellow (10YR 6/6) cherty clay; moderate, medium, subangular blocky structure; firm.

The bedrock is at depths of 15 to 40 feet.

Generally, there is enough chert in this soil to interfere materially with cultivation and reduce productivity. The chert fragments range up to 4 or 5 inches in diameter. As a result of cultivation and subsequent erosion, about two-thirds of the acreage lacks an A_1 horizon. Scattered spots have lost all of the original surface soil and now have a surface layer of strong-brown cherty silty clay loam. In a few areas in which the soil seems to have developed on sandy limestone, the surface soil is more like cherty loam than cherty silt loam.

The permeability of this soil is moderately slow, and the moisture-supplying capacity is about medium.

Use and suitability.—About 35 percent of this soil is in forest, and the rest is in crops.

This soil will stand fairly intensive use if heavily fertilized and limed. All of the common crops can be grown. Yields of corn, small grains, and tobacco are fair. Alfalfa and orchardgrass can be grown, but fescue and lespedeza, which will grow on less fertile soil, are better suited.

Fullerton cherty silt loam, moderately steep phase (12 to 20 percent slopes) (FcD) (capability unit IVe–2).—This soil is in tracts of 2 to 10 acres throughout general soil areas 1 and 2. It is like the sloping phase but

is on the moderately long side slopes instead of on hilltops and ridge tops.

About half of the acreage has been cultivated and is slightly to moderately sheet eroded. Except in a few spots, however, the plow layer is still within the original surface soil. The uppermost 7 to 10 inches is yellowish-brown, friable cherty silt loam. Under this is strong-brown cherty silty clay loam that grades at a depth of about 2 feet to yellowish-red cherty clay. The depth to the bedrock ranges from 10 to 35 feet.

This soil contains enough chert to interfere with cultivation. The fragments are up to 4 or 5 inches in diameter. The moisture-supplying capacity is medium to low. The erosion hazard is less serious than on the finer textured Decatur, Dewey, and Talbott soils.

Use and suitability.—About half of this soil is in forest that consists mainly of hardwood trees. The remainder is used for a wide variety of crops but predominantly for pasture and hay.

This soil is low in fertility. In its natural state it is not productive. It requires large amounts of nitrogen, phosphorus, potassium, and calcium. If these elements are added in sufficient quantities, fair to good yields of the common crops can be expected. Cultivated crops should not be grown more often than once in 5 or 6 years.

Fullerton cherty silt loam, steep phase (20 to 30 percent slopes) (FcE) (capability unit VIe–2).—This soil is distinguished by a surface soil of yellowish-brown cherty silt loam and a subsoil of yellowish-red or red cherty clay. It is on moderately long slopes in the uplands. The areas range from medium to large in size. About 40 percent of the acreage has been cleared and cultivated and is slightly to moderately sheet eroded. In scattered spots the yellowish-red subsoil material is exposed. The depth to the bedrock ranges from 8 to 25 feet.

The permeability of this soil is moderately slow, and the moisture-supplying capacity is low.

Use and suitability.—About 60 percent of this soil is in forest. Steep slopes prevent its use for crops, but it can be used for pasture. Heavy fertilization is required to make the pastures productive. Plants that have low requirements for nutrients and moisture should be grown.

Fullerton cherty silt loam, very steep phase (30+ percent slopes) (FcF) (capability unit VIIe–1).—This soil is in medium-sized to large areas on long slopes in the uplands. Its surface soil is yellowish-brown cherty silt loam and is about 8 or 9 inches thick. The subsoil is yellowish-red to red cherty silty clay loam that grades to cherty clay at a depth of about 20 inches. The depth to the bedrock ranges from about 6 to 25 feet.

Use and suitability.—About 75 percent of this soil is in forest. The remainder is mostly in unimproved pasture; some is idle.

Because of its very steep slopes and chertiness, this soil is poorly suited to crops or pasture. Its best use is forest. Loblolly pine and shortleaf pine are suitable.

Fullerton cherty silty clay loam, severely eroded moderately steep phase (12 to 20 percent slopes) (FdD3) (capability unit VIe–2).—This soil is in areas of 2 to 5 acres, on moderately long slopes in the uplands. It is associated with Clarksville soils and other Fullerton soils. It is similar to Fullerton cherty silt loam, sloping phase, except that erosion has removed almost all of the original surface soil. The present surface soil is strong-brown to yellowish-red cherty silty clay loam. The subsoil is yellowish-red to red cherty clay. The depth to the bedrock ranges from 10 to 25 feet.

Because of its cherty, clayey surface layer, this soil is difficult to work. Its moisture-supplying capacity is low. Runoff and erosion are difficult to control.

Use and suitability.—All of this soil has been cleared and cropped. Pasture is now the main use, but a small acreage is used for corn, small grains, and hay crops.

This is a fair soil for pasture and forest, but a poor one for tilled crops. Its fertilizer requirements are high, and its response is poor. Fescue is one of the better suited pasture plants, but even it needs fertilization. Yields of alfalfa, orchardgrass, and ladino clover are not high.

Fullerton cherty silty clay loam, severely eroded steep phase (20 to 30 percent slopes) (FdE3) (capability unit VIe–2).—This soil occurs on long slopes in the uplands, with Clarksville soils and other Fullerton soils. The areas are 2 to 5 acres in size. Most of the original surface soil has been lost through erosion. The present surface layer is strong-brown or yellowish-red cherty silty clay loam. The subsoil is yellowish-red to red cherty clay. The depth to the bedrock ranges from 7 to 25 feet.

Because of the chert and the clayey surface layer, tilth and workability are poor. The moisture-supplying capacity is low. Runoff is rapid, and the hazard of further erosion is serious.

Use and suitability.—Most of this soil is used for unimproved pasture. A few areas are reforesting naturally (fig. 10).

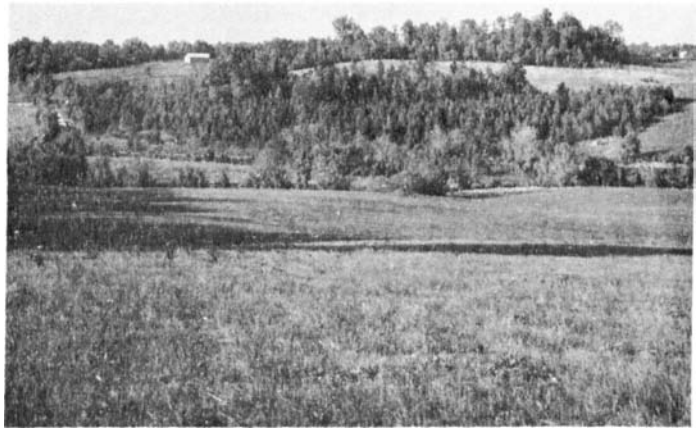

***Figure 10.*—Young forest (center) on Fullerton cherty silty clay loam, severely eroded steep phase, and unimproved pasture on cherty Fullerton soil.**

Steep slopes, chertiness, and erosion damage make this soil unsuitable for crops. It is only fair for pasture. The fertilizer requirements are high, and the response is poor. Only plants that can withstand droughtiness and low fertility are suitable. Areas not needed for pasture can be used for forest.

Fullerton cherty silty clay loam, severely eroded very steep phase (30+ percent slopes) (FdF3) (capability unit VIIe–1).—This soil is in small to medium-sized areas on long slopes in the uplands. Most of the original

surface soil has been lost through erosion. The present surface layer is strong-brown to yellowish-red cherty silty clay loam. The subsoil is yellowish-red to red cherty clay. The depth to the bedrock ranges from 5 to 25 feet.

Use and suitability.—Most of this soil is either idle, or in native pasture, or in volunteer forest. It is too steep, eroded, and cherty for either crops or pasture. It should be reforested, if at all feasible. Loblolly pine and shortleaf pine are suitable.

Fullerton silt loam, gently sloping phase (2 to 5 percent slopes) (FsB) (capability unit IIe–2).—This soil is on the rounded tops of hills and ridges, just above areas of steeper Fullerton soils. The areas are small or medium sized. There is very little chert on the surface or in the soil. A description of a representative profile follows.

- A_1 0 to 2 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, crumb structure; very friable; a few fine chert fragments.
- A_2 2 to 9 inches, yellowish-brown (10YR 5/4) silt loam; moderate, fine and medium, granular structure; very friable.
- A_3 9 to 14 inches, yellowish-brown (10YR 5/6) silt loam; moderate, medium, granular structure; friable; a few fine chert fragments.
- B_1 14 to 18 inches, strong-brown (7.5YR 5/6) or yellowish-red (5YR 5/6) silty clay loam; moderate, fine, subangular blocky structure; friable; a few small chert fragments.
- B_2 18 to 36 inches, yellowish-red (5YR 4/6) clay; strong, medium, subangular blocky structure; firm to very firm; a few small chert fragments.
- B_3 36 to 48 inches, yellowish-red (5YR 4/6) clay; strong, medium, subangular blocky structure; firm; common, distinct, brownish-yellow variegations; few small chert fragments.
- C 48 to 65 inches, variegated red (2.5YR 4/6), yellowish-red (5YR 4/6), and brownish-yellow (10YR 6/6) clay or silty clay; moderate, medium, subangular blocky structure; firm; numerous small chert fragments.

The depth to the limestone bedrock ranges from 6 to 30 feet. In a few places it is less than 6 feet. There are a few outcrops. The depth is slightly less in the southern part of the county than in the northern part. A few areas or strips have a loam surface soil. The soil in these areas developed from sandy limestone or limestone containing lenses of sandstone.

This soil has good tilth and good structure and is easy to maintain. It has moderately slow permeability, and its moisture-supplying capacity is about medium. Much of the acreage has been slightly to moderately sheet eroded, but the plow layer is still mostly within the silt loam surface soil.

Use and suitability.—About 15 percent of this soil is in forest. Except for a small idle acreage, the remainder is used for crops. Corn and small grains are grown extensively. Orchardgrass, alfalfa, and lespedeza are grown for hay and pasture.

This soil is suited to all of the common crops. Its fertilizer requirements are high. Since the slopes are not strong, rotations can be short.

Fullerton silt loam, sloping phase (5 to 12 percent slopes) (FsC) (capability unit IIIe–2).—This soil is chiefly on the rolling tops of hills and ridges. Some areas are on the side slopes of low, rolling hills. The surface soil is yellowish-brown silt loam and is about 5 to 8 inches thick. Underlying this is strong-brown silty clay loam that grades to yellowish-red clay at a depth of about 18 inches. The depth to the bedrock ranges from 6 to 30 feet. None of the acreage is more than moderately eroded. Generally, the plow layer is within the silt loam surface soil.

This soil responds to good management. Its good tilth and structure are easy to maintain. Its capacity to supply moisture is about medium. Permeability is moderately slow.

Use and suitability.—About 20 percent of this soil is in forest. The rest is used for crops and pasture. Pastures consist mostly of lespedeza and some native plants.

This soil is suitable for frequent cropping. It is suited to all the common crops (fig. 11). If well fertilized, it is especially productive of grasses and legumes.

***Figure 11.*—Burley tobacco on Fullerton silt loam, sloping phase; forest (background) on moderately steep Fullerton soils.**

Fullerton silt loam, moderately steep phase (12 to 20 percent slopes) (FsD) (capability unit IVe–1).—This soil has somewhat thinner layers than the gently sloping phase, and a somewhat shallower profile. It is on side slopes rather than on hill crests. The surface soil is yellowish-brown silt loam; in wooded areas it is 8 or 9 inches thick; in other places it is 5 to 7 inches thick. The underlying material is strong-brown silty clay loam that grades to yellowish-red or red, firm clay at about 18 inches. The depth to the bedrock ranges from 6 to 20 feet.

Some of this soil is uneroded, and some is slightly to moderately eroded. Over most of the acreage, the plow layer is within the original surface soil. In small, scattered spots, the subsoil is exposed. More common are areas where some subsoil has been mixed with the surface soil by tillage. The surface soil in these areas is redder and a little more clayey than the original surface soil.

This soil absorbs water fairly rapidly. Its moisture-supplying capacity is medium. Tilth is good, and the favorable structure is easy to maintain. There are small amounts of fine chert in most areas, but not enough to interfere with farming operations or productivity.

Use and suitability.—Nearly 30 percent of this soil is in forest. Unimproved pasture, mostly of lespedeza, is the chief use of the rest. Small acreages are used for crops.

This soil is suited to all the common crops. Unless heavily fertilized, it produces very low yields, but it responds to fertilization and other good management practices. It is better suited to grasses and legumes than to tilled crops. Tilled crops should not be grown more often than once in 5 or 6 years.

Fullerton silt loam, steep phase (20 to 30 percent slopes) (FsE) (capability unit VIe–1).—This soil is in medium-sized to large tracts on moderately long, steep slopes throughout general soil areas 1 and 2. The surface soil is yellowish-brown, friable silt loam and is about 4 to 7 inches thick. Underlying it is a layer of strong-brown silty clay loam that grades to yellowish-red or red, firm clay at a depth of about 15 inches. The depth to the bedrock is 5 to 20 feet.

Some areas of this soil are uneroded, and some are slightly to moderately eroded. However, over most of the acreage, the surface soil is silt loam. In some scattered, small areas the subsoil material is at the surface, and the topsoil is more like silty clay loam than silt loam.

The moisture-supplying capacity is medium to low. Because of the steep slopes, runoff is fairly rapid; nevertheless, this soil is less erosive than the steep Decatur, Dewey, Talbott, and other finer textured soils.

Use and suitability.—About 45 percent of this soil is in forest. The rest is used chiefly for unimproved pasture. A small part is used for corn, small grains, and lespedeza for hay.

This soil is poorly suited to cultivated crops. Pasture and forest are the best uses for it. Good pastures can be established and maintained, but fertilizer requirements are high. All of the common pasture plants can be grown.

Fullerton silt loam, very steep phase (30+ percent slopes) (FsF) (capability unit VIIe–1).—This soil is on very steep upland slopes. It is similar to Fullerton silt loam, gently sloping phase, except that the horizons are somewhat thinner.

Use and suitability.—Approximately half of this soil is in forest. The rest is used mainly for unimproved pasture, but some is idle.

This soil is not suited to cultivated crops and is rather poorly suited to pasture. The very steep slopes and rapid runoff make control of water very difficult. Because of this, forest appears to be the most profitable use.

Fullerton silty clay loam, severely eroded sloping phase (5 to 12 percent slopes) (FtC3) (capability unit IVe–3).—This soil is on crests of hills and ridges and on short slopes of low, rolling hills. The individual tracts are small. Erosion has removed almost all of the original surface layer. The plow layer consists of strong-brown or yellowish-red, firm silty clay loam, and the underlying material is yellowish-red or red, firm clay. The limestone bedrock is at depths of 5 to 25 feet.

Tilth is poor; the soil is hard when dry and plastic or easily puddled when wet. The amount of moisture available to plants is medium to low. Infiltration of water is rather slow, and runoff is moderately rapid.

Use and suitability.—Corn, small grains, and lespedeza are grown on a few areas of this soil. Most of it is used for unimproved pasture, consisting mostly of lespedeza and some volunteer plants. Several areas are idle.

Because of low fertility, poor tilth, and low moisture-supplying capacity, the productivity of this soil is low. The response to management and fertilization is moderate. All crops can be grown, but fall-sown small grains and legumes and grasses for hay and pasture are better suited than corn, tobacco, and most vegetables.

Fullerton silty clay loam, severely eroded moderately steep phase (12 to 20 percent slopes) (FtD3) (capability unit IVe–3).—This soil is on moderately long upland slopes. The separate tracts are small. The surface layer, which consists mostly of subsoil material, is strong-brown or yellowish-red silty clay loam. The subsoil is yellowish-red or red, firm clay. The limestone bedrock is at depths of 5 to 20 feet.

Favorable tilth and structure are difficult to maintain, as the surface layer is hard when dry and plastic when wet. The moisture-supplying capacity is low. Runoff develops quickly because of the strong slopes and the fine-textured surface soil. Control of water is a dominant problem.

Use and suitability.—All of this soil has been cleared. Volunteer Virginia pine is growing on a small acreage, and a few areas have been planted to shortleaf pine and loblolly pine. Most of the acreage is used for unimproved pasture that consists mainly of lespedeza but includes some volunteer grasses and native plants.

This soil is not good for cultivated crops, but it will produce fair yields if well fertilized and used in very long rotations. It is not suited to tobacco or vegetables. If well fertilized, it produces good yields of small grains and the common hay and pasture plants.

Fullerton silty clay loam, severely eroded steep phase (20 to 30 percent slopes) (FtE3) (capability unit VIe–1).—This soil is on long, steep slopes in the uplands and is associated with Clarksville soils and other Fullerton soils. All of the original surface soil has been removed. The uppermost 6 inches is strong-brown or yellowish-red silty clay loam. The subsoil is yellowish-red or red, firm clay. The depth to the bedrock ranges from 4 to 20 feet. A few shallow gullies have formed in some areas, but they can generally be obliterated with ordinary farm machinery. Because of the steep slopes and clayey surface soil, runoff is rapid and the hazard of erosion is high if the soil is unprotected.

Use and suitability.—All of this soil has been cleared and apparently overcropped. Most of it is used for unimproved pasture or is idle. A few areas have been abandoned and are reverting to forest, and a small acreage has been planted to trees.

Because of the steep slopes, low fertility, and poor tilth, this soil is not suited to cultivated crops; it is best suited to pasture or forest. If well fertilized, it will produce fair to good stands of fescue, orchardgrass, and other pasture plants.

Greendale Series

The soils of the Greendale series are deep, well drained, and productive. They have developed at the base of slopes, along intermittent drainageways, and in depressions, throughout the limestone belts of the county. The parent material was local alluvium or colluvium derived from Fullerton and Clarksville soils.

The surface soil is brown, friable silt loam, and the subsoil is brown silt loam to silty clay loam. In some areas chert is common in the surface soil and the subsoil. The relief is nearly level to very gently sloping. Most areas are slightly concave.

Greendale soils occur with Minvale and Landisburg soils. They have less well developed horizons than the associated soils. In position and age, they are similar to the darker colored Emory soils.

These soils are moderately permeable. They have a very high moisture-supplying capacity. They are easy to work and to conserve. Their reaction is medium acid.

Greendale silt loam (1 to 4 percent slopes) (Ge) (capability unit I–1).—This soil occupies narrow, concave strips along intermittent drainageways and on foot slopes. A small acreage is in small, saucerlike depressions and sinks. Many areas occur where lateral drains have deposited sediments on flood plains. Although most of the acreage is practically free of chert and stones, many areas have small amounts of chert, but not enough to impair the productivity. A description of a representative profile follows.

0 to 12 inches, yellowish-brown to brown (10YR 5/4 to 5/3) silt loam; moderate, fine, granular structure; very friable.
12 to 30 inches, yellowish-brown (10YR 5/4) silt loam that grades to light silty clay loam in places; moderate, medium, granular structure; friable.
30 to 48 inches +, yellowish-brown (10YR 5/4 to 5/6) silt loam with a few brownish-yellow and gray mottles; mottles more numerous below 36 inches.

Almost all areas are underlain by limestone residuum at depths of 4 to 6 feet.

This soil is moderately high in fertility. It contains a moderately high amount of organic matter. Its supply of plant nutrients and organic matter is replenished by deposits of material washed down from adjacent upland slopes by runoff and seepage water. Tilth is very good, and there is little or no hazard of erosion.

Use and suitability.—Nearly all of this soil has been cleared of its native hardwood forest. Probably two-thirds of the acreage is used for corn, tobacco, vegetables, and lespedeza. Most of the other third is used for pasture. Many areas are small and are used in the same way as the rest of the fields within which they occur.

This soil is well suited to intensive use. It is suited to all of the common row crops. If it is adequately fertilized, yields are high. Alfalfa grows fairly well in places, but it seems to grow better on the Decatur and other finer textured soils of the uplands. Pasture on this soil is good, even during the dry part of the growing season.

Greendale cherty silt loam (1 to 4 percent slopes) (Gc) (capability unit I–1).—This soil has enough fine chert on the surface and in the profile to interfere with cultivation and impair productivity.

Use and suitability.—Almost all of this soil is used for the common crops, mostly for corn, small grains, lespedeza, tobacco, and vegetables. Many areas are very small and are used in the same way as the rest of the fields in which they occur.

This soil is not so productive as the chert-free Greendale soil, but it is nevertheless suited to the common crops. If well fertilized, it produces moderate yields of corn, tobacco, small grains, and most hay crops. Alfalfa does not last long or yield well. Pasture is good, even during the dry parts of the growing season.

Gullied Land

Gullied land, limestone materials (10 to 40 percent slopes) (Gl) (capability unit VIIs–1).—This land type occurs in small and medium-sized areas scattered thinly over the limestone belts of the county. It consists of areas of Decatur, Dewey, Fullerton, Talbott, and Tellico soils that have been severely damaged by erosion. In most places, much or all of the surface soil has been removed, and gullies of various depths form an intricate pattern. The surface is too rough for the use of ordinary farm machinery.

Most of this land is hilly. It is low in fertility and has poor tilth. A large part of it is droughty because the clayey subsoil material has a very low moisture-supplying capacity.

Use and suitability.—All of the acreage has been cropped. Much of it now has a variable cover of briers, sassafras, and other weeds. Some is in pine forest that has reestablished itself.

This land type is poorly suited to either crops or pasture. Most of it should be forested. Some of the less severely gullied areas can be used for pasture if they are smoothed off with heavy machinery and properly fertilized and seeded, but the cost of this reclamation is high.

Gullied land, shale materials (10 to 40 percent slopes) (Gs) (capability unit VIIs–1).—This land type consists of areas of Steekee, Litz, and Sequoia soils that have been severely damaged by erosion. Most of the surface soil has been removed, and gullies of various depths form an intricate pattern. The surface is too rough to allow the use of ordinary farm machinery. The relief is hilly to steep.

In the areas that were formerly Litz and Sequoia soils, only a few of the gullies are more than 3 feet deep. In the areas that were formerly Steekee soils, the gullies are moderately shallow to very deep; some are as much as 20 feet deep. Much of the original surface soil of the Sequoia and Litz soils has been removed. In the Steekee areas, a notable part of the original surface layer still remains, because erosion has been confined mostly to the gullies.

This unit is low in fertility and is very droughty. The shale bedrock is at or very near the surface in the Sequoia and Litz areas. In the Steekee areas, the depth to the bedrock is more variable.

Use and suitability.—All of this unit has been cleared and cropped. Some areas have reverted to pine forest, but much of the acreage has a cover of briers, sassafras, and other weeds. Kudzu is established in a few areas.

Many of the areas that consist of Sequoia and Litz soil materials could be reclaimed and used for pasture. However, the cost would be high because the land would have to be smoothed before seeding and would have to be protected until pasture plants become established. The Steekee areas would be more difficult to reclaim than the other areas because the slopes are steeper and the gullies are deeper. Most of this land type is best suited to pine forest.

Hermitage Series

The soils of the Hermitage series are deep and well drained. They commonly have a surface soil of dark-brown silt loam and a subsoil of yellowish-red silty clay loam. The parent material was local alluvium and colluvium derived from limestone. Most of it came from Dewey, Decatur, and Bolton soils. The relief is dominantly undulating to rolling. Many areas are slightly concave.

These soils occur mostly in general soil area 4, in tracts of 2 to 3 acres. They are associated with Emory soils, which are on the colluvial lands, and with Dewey, Decatur, and Bolton soils, which are on the uplands. Hermitage soils differ from Emory soils mainly in being older and having moderate profile development. They are similar to Minvale soils in position and age, but they are much browner and redder throughout.

These soils are among the most fertile soils in the county. They are highly productive and are important agriculturally. They are medium acid to strongly acid. They are moderately permeable and easy to work and conserve. Their response to management is excellent because of their favorable physical properties and high moisture-supplying capacity.

Hermitage silt loam, gently sloping phase (2 to 5 percent slopes) (HeB) (capability unit IIe–1).—This soil is on gentle foot slopes, between areas of Dewey and Decatur soils on the uplands and narrow strips of Emory soils along the drainageways. The parent material included some sediment derived from Talbott soils. A description of a representative profile follows.

- A_p 0 to 8 inches, dark-brown (7.5YR 3/2) silt loam; weak, medium, granular structure; very friable.
- B_1 8 to 17 inches, reddish-brown (5YR 4/4) coarse silty clay loam; weak, fine, subangular blocky structure; friable.
- B_2 17 to 38 inches, yellowish-red to reddish-brown (5YR 4/6 to 4/4) silty clay loam; moderate, fine, subangular blocky structure; friable.
- B_3 38 to 54 inches, yellowish-red to red (5YR 4/8 to 2.5YR 4/8) silty clay loam; a few brownish-yellow variegations; moderate, medium, subangular blocky structure; friable.

The depth to bedrock ranges from 5 to 12 feet. The surface soil is 4 to 10 inches thick. It is uniformly brown to dark brown. Some areas that are associated with Talbott soils have a yellowish-brown subsoil. The variability in depth of the surface soil is the result, mostly, of differences in erosion. Most of the acreage is only slightly eroded and has 7 or 8 inches of surface soil, but there are scattered areas where the present surface layer is only 4 to 6 inches thick.

This soil contains a moderate amount of organic matter. Its moisture-holding capacity is high. Roots penetrate it extensively. Erosion is not a great hazard, although the more strongly sloping areas may require some erosion control practices.

Use and suitability.—Almost all of this soil has been used for crops. About 25 percent is now used for corn, 25 percent for pasture, and almost 25 percent for hay. The rest is used for tobacco, vegetables, and other crops.

This is one of the best soils in the county for crops and pasture. It is suited to a wide variety of crops. The more exacting legumes and grasses grow well, and the carrying capacity of the pastures is high.

Hermitage silt loam, eroded sloping phase (5 to 12 percent slopes) (HeC2) (capability unit IIIe–1).—In many areas of this soil, some of the subsoil has been mixed with the remaining surface soil, and the resulting plow layer is reddish-brown or dark-brown silt loam. The underlying material is similar to that of Hermitage silt loam, gently sloping phase, but is a little shallower.

This is a fertile soil that contains a moderate amount of organic matter. The erosion hazard is moderate.

Use and suitability.—All of this soil has been cultivated. Much of it is now used for crops, mainly corn, hay, and small grains. Tobacco is the most important cash crop. Rotation pasture is also important.

This soil is suited to a wide variety of crops, but because of its moderately strong slopes, it cannot be used so intensively as the gently sloping phase. It is well suited to legumes and grasses for hay or pasture. The potential yields of all crops are high.

Hermitage cherty silt loam, sloping phase (5 to 12 percent slopes) (HcC) (capability unit IIIe–1).—This soil has a moderate number of fine chert fragments on the surface and throughout the profile. The surface soil is dark-brown cherty silt loam, about 4 to 8 inches thick, and the subsoil is reddish-brown or yellowish-red cherty silty clay loam. The range in depth of the surface soil is caused mostly by variations in the degree of erosion.

This soil is moderately high in fertility. Its moisture-supplying capacity is slightly less than that of the non-cherty Hermitage silt loam; it ranges from medium to high. The chert interferes with but does not prevent cultivation; however, it does lower productivity considerably. The moderate permeability is favorable for penetration of roots and for circulation of air and moisture. Erosion is a moderate hazard.

Use and suitability.—This soil is used for row crops, hay, and pasture. Corn, small grains, lespedeza, and tobacco are the most common crops.

Even though this soil is cherty, it is suited to all the common crops. Yields are not so high as on the chert-free Hermitage soils, but moderately high yields of all crops can be obtained if the soil is well fertilized and otherwise well managed.

Huntington Series

The well-drained, medium-textured soils of the Huntington series are some of the best soils in the county. They consist of recent alluvium along streams. A large part of the acreage is on first bottoms along the Tennessee River. Other areas are along the Clinch River and on flood plains of small streams in the limestone belts of the county. Some areas are subject to flooding.

Huntington soils occur with Lindside soils, which are imperfectly drained, and with Melvin soils, which are poorly drained. They are also associated with Sequatchie soils, which occupy low terraces and are a few feet higher than the Huntington soils.

There is little profile development in the Huntington soils. Many profiles show little differentiation to depths of several feet. Others are stratified, and in many places dark-colored horizons are buried by light-colored horizons.

The natural fertility of these soils is high. Their reaction is slightly acid to neutral. They are moderately

permeable, have very high moisture-supplying capacity, and allow extensive root penetration and root development. Because of high productivity and a wide range in suitability, Huntington soils are highly valued for agriculture.

Huntington loam, nearly level phase (0 to 3 percent slopes) (HnA) (capability unit I–1).—This is a deep soil that is in long, nearly level strips near and parallel to the stream channels. The areas along the small streams are likely to be flooded occasionally; those along the Tennessee and Clinch Rivers are protected by flood-control dams upstream. A description of a representative profile follows.

0 to 12 inches, dark-brown (10YR 4/3 to 3/3) loam; weak, fine, granular structure; very friable.
12 to 24 inches, dark-brown (7.5YR 4/4) loam; weak, medium, granular structure; very friable.
24 to 36 inches, dark-brown (7.5YR 4/4) fine loam or silt loam; moderate, medium, granular structure; friable.
36 to 60 inches, dark-brown (10YR 4/3) fine silt loam with a few grayish-brown mottles; weak, medium, granular structure; friable.

The texture of the surface layer varies from loam, in the areas along the Tennessee River, to silt loam, in the areas along the small streams. In some of the areas along the small streams, recently deposited material washed from nearby Dewey and Decatur soils has given the surface a reddish-brown color. Along the Tennessee and Clinch Rivers, the surface is uniformly dark brown and the soil is more stratified.

This soil contains much organic matter. It is easy to manage, to work, and to conserve.

Use and suitability.—This soil is used intensively for crops, mainly corn, small grains, and hay. Many areas are used continuously for corn.

This soil is well suited to all the common crops. If adequately fertilized, it can be used intensively and will give high yields of all crops. It responds to phosphate, potash, and nitrogen. It needs little or no lime.

Huntington loam, sloping phase (5 to 12 percent slopes) (HnC) (capability unit I–1).—This soil is on long, very narrow bands that separate two levels of bottom land. The first level of bottom land is next to the stream channel and is only a few feet wide and nearly level. Next to this strip is the narrow band of Huntington soil that slopes up to the second and slightly higher level of bottom land.

Most of this soil is along the Tennessee and Clinch Rivers. The individual areas are generally about 150 feet wide.

Use and suitability.—Almost all of this soil is used for crops—mainly corn, small grains, and hay. A small part is used for rotation pasture. Because the areas are so small, many of them are used in the same way as the remainder of the field, but some are left in hay or sod while the remainder of the field is in corn.

This soil is suited to all the common crops. It can be kept highly productive. It responds well to phosphate, potash, and nitrogen, and it requires little or no lime.

Landisburg Series

The Landisburg series consists of moderately well drained soils that have a weak to strong fragipan at a depth of about 2 feet. These soils have developed in local alluvium or colluvium washed mostly from Fullerton and Clarksville soils.

These soils are in small areas scattered throughout general soil areas 1 and 2. They are on undulating to rolling foot slopes, benches, and fans at the base of upland slopes. They are associated with Minvale and Greendale soils of the colluvial lands, with Fullerton and Clarksville soils of the uplands, and with Lindside and Lobelville soils of the bottom lands. They occupy positions between Fullerton or Clarksville soils which are on the upland slopes, and Greendale or Lobelville soils, which are along the drainageways.

Landisburg soils are similar to Minvale soils in position, age, and parent materials, but they differ in having a fragipan, in being less well drained, and in being lighter colored throughout.

Landisburg soils are moderately low in fertility and very strong in acidity. They are low in organic matter. Except where they are cherty, the soils have good tilth and are easy to work.

Landisburg silt loam, gently sloping phase (2 to 5 percent slopes) (LdB) (capability unit IIe–4).—This soil lies below areas of Clarksville and Fullerton soils and above strips of younger Greendale soils. The fragipan, which is at a depth of about 24 inches, ranges from weak to strong in development. A description of a representative profile follows.

A_p 0 to 8 inches, yellowish-brown (10YR 5/4) or dark grayish-brown (10YR 4/2) silt loam; weak, medium to fine, granular structure; very friable.
B_1 8 to 12 inches, yellowish-brown (10YR 5/6) or brownish-yellow (10YR 6/6) fine silt loam; weak, fine, subangular blocky structure; friable.
B_2 12 to 25 inches, brownish-yellow (10YR 6/6) silty clay loam; weak, medium and fine, subangular blocky structure; friable; about 5 percent fine chert fragments.
B_{3m} 25 to 36 inches, light yellowish-brown (10YR 6/4) coarse silty clay loam to silt loam; many gray mottles; weak structure or structureless (massive); compact and brittle in places.
C_m 36 to 48 inches, variegated brownish-yellow (10YR 6/6), strong-brown (7.5YR 5/6), and light-gray (10YR 7/2) silty clay; massive; firm; limestone bedrock at depths of 5 to 15 feet.

This soil has a medium moisture-supplying capacity. The surface soil and the upper part of the subsoil are moderately permeable, but the substratum is compact and slowly permeable. Runoff is slow, and internal drainage is moderate to moderately slow.

If adequately fertilized, this soil is suited to most of the row crops commonly grown in the county, and to small grains, red clover, white clover, lespedeza, timothy, orchardgrass, fescue, and other legumes and grasses. Rotations can be short. Because of the moderately slow internal drainage, alfalfa stands do not last long, even under good management.

Use and suitability.—Nearly all of this soil is cultivated; only a very small proportion is idle. About 20 percent is used for corn; 20 percent for hay, mostly lespedeza; 15 percent for small grains; and 25 percent for pasture. The rest of the cultivated acreage is in tobacco, vegetables, and other crops.

Landisburg silt loam, eroded sloping phase (5 to 12 percent slopes) (LdC2) (capability unit IIe–4).—This soil is in a few small tracts scattered throughout general soil area 1 and in a few tracts in general soil area 2. Most

of it is moderately eroded, and small quantities of the subsoil have been mixed with the surface soil through tillage. The limestone bedrock is at depths of 5 to 15 feet.

The 6- to 7-inch plow layer normally is yellowish-brown, friable silt loam. The subsoil is brownish-yellow to yellowish-brown, friable silty clay loam. The upper part of the fragipan is mottled with gray. A few of the more strongly sloping, exposed spots have a yellowish-brown, heavy silt loam surface soil.

This soil is moderately permeable above the fragipan, but below depths of 20 to 24 inches it is slowly permeable. It has good tilth and is easy to work.

Use and suitability.—Except for alfalfa, all crops commonly grown in the county are suited to this soil. Even under good management, alfalfa does not last long because the drainage is inadequate. A suitable rotation is a row crop, a small grain, and then hay or pasture for 1 or 2 years. Unless this soil is heavily fertilized, yields of all crops are low.

Landisburg cherty silt loam, gently sloping phase (3 to 12 percent slopes) (LcB) (capability unit IIe–4).—Almost all of this soil is in general soil area 1. The relief ranges from gently sloping to sloping. On the surface and in the soil there are many fine chert fragments up to about 3 inches in diameter. The chert interferes with but does not prevent cultivation. It lowers the productivity and impairs the moisture-supplying capacity. Permeability is moderate in the uppermost 2 feet, above the fragipan, but the pan is slowly permeable.

Use and suitability.—This soil is used for pasture and for the common crops, mostly corn and lespedeza for hay. Yields of most crops are fair. Alfalfa does not last long or yield well, even under good management.

Because of the chert and its effects on the moisture supply, this soil does not respond well to management. Under moderate fertilization and associated good management, medium yields of corn, small grains, red clover, white clover, lespedeza, and all the common grasses can be expected. To establish legumes, nitrogen fertilizers are essential.

Leadvale Series

The Leadvale series consists of moderately well drained soils that normally have a pan at a depth of about 20 inches. These soils have developed from local alluvium and colluvium, most of which was derived from Litz and Sequoia soils. They are on foot slopes between Litz and Sequoia soils, which are on upland slopes, and Barbourville and Lindside soils, which are along the narrow drainageways.

Leadvale silt loam, gently sloping phase (2 to 5 percent slopes) (LeB) (capability unit IIe–4).—This soil is on foot slopes, benches, and colluvial fans below shaly hills. Some of the larger areas are in the shale valley that parallels U.S. Highway No. 411 in the extreme southern part of the county. Other small areas are thinly scattered in the narrow valleys underlain by shale. All areas are in general soil area 3. Included with this soil is about 70 acres that has slopes of 5 to 12 percent. A description of a representative profile follows.

A_p 0 to 8 inches, yellowish-brown (10YR 5/4) silt loam; moderate, medium, granular structure; very friable.
B_1 8 to 14 inches, brownish-yellow (10YR 6/6) silty clay loam; moderate, fine, subangular blocky structure; firm but slightly friable.
B_2 14 to 22 inches, brownish-yellow (10YR 6/6) silty clay loam; moderate, medium, subangular blocky structure; firm; few, fine, gray and yellow mottles in lower part.
B_{2m} 22 to 48 inches, brownish-yellow (10YR 6/6) silty clay loam with many yellow and light brownish-gray mottles; structureless (massive); firm.

The shale bedrock is at depths of 3 to 6 feet.

Differences in degree of erosion make the thickness of the surface soil vary between 5 and 9 inches.

This soil is moderately low in fertility. It is very strongly acid. It contains little organic matter. The upper 20 inches is moderately permeable, but the pan retards water movement and root penetration below this depth. The moisture-supplying capacity is medium. The soil is easy to work and to conserve.

Use and suitability.—Almost all of this soil is used for crops and pasture. Corn, small grains, hay, and tobacco are grown.

Alfalfa does not last long or yield well, but corn, small grains, red clover, timothy, orchardgrass, lespedeza, fescue, tobacco, and vegetable crops are suitable. Tobacco has been slightly damaged during prolonged wet periods, generally in small spots where excess water accumulates above the pan. For good yields of all crops, large amounts of lime, nitrogen, phosphorus, and potassium are needed.

Lehew Series

The soils of the Lehew series are shallow, reddish in color, and excessively drained. They have developed in residuum from noncalcareous interbedded sandstone and shale (fig. 12). These soils are in general soil area 8, which is in the northern part of the county just north of Eaton Crossroad. They form narrow, prominent, fairly straight ridges that generally have hilly to very steep slopes and even crests. Adjoining these soils on the south are Litz and Sequoia soils; on the north are Fullerton and Clarksville soils.

Lehew soils resemble Steekee soils but are more acid and less red. They are coarser textured, redder, and steeper than Litz soils.

Lehew soils are low in fertility. They are very strongly acid to extremely acid. Their moisture-supplying capacity is low. They are highly erosive if cultivated.

Lehew loam, moderately steep phase (12 to 20 percent slopes) (LhD) (capability unit IVs–1).—This soil is on fairly short upland slopes. The areas range from about 3 to 10 acres in size. A description of a representative profile follows.

A_1 0 to 1 inch, very dark grayish-brown (10YR 3/2) loam; weak, fine, crumb structure; very friable.
A_2 1 to 7 inches, reddish-gray to reddish-brown (5YR 5/2 to 4/3) loam; weak, fine, granular structure; very friable.
BC 7 to 20 inches, reddish-brown (5YR 5/3) loam; weak, medium, granular structure; very friable; a few fragments of soft sandstone and sandy shale.
D_r 20 inches, partly weathered, interbedded, acid sandstone and shale bedrock.

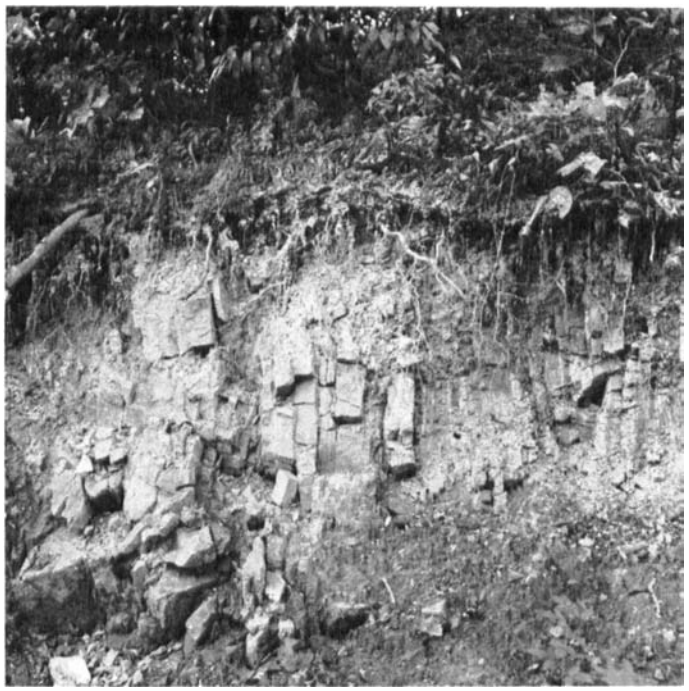

Figure 12.—**Sandstone and shale bedrock of the shallow Lehew soils, tilted to a vertical position.**

The depth to the bedrock ranges from a few inches to about 2 feet. The thickness of the surface soil varies with the degree of erosion. The few areas that are cleared are eroded and have only 4 or 5 inches of the original surface layer. A few small spots are severely eroded and have a surface soil of shaly loam or shaly fine sandy loam.

This soil is low in organic matter. Except where the slopes are strongest, the soil is easy to work and has good tilth. Productivity is low.

Use and suitability.—About half of this soil is in forest. The stands are thin and consist of hardwood and pine trees. The cleared portion of this soil is mostly idle or in unimproved pasture.

This soil is not productive of crops or pasture because it is shallow, droughty, strongly sloping, and low in fertility. If no better soils are available, however, it can be used fairly successfully for pasture and crops. Fescue is probably the most suitable pasture plant. Small grains are the most suitable crops because they mature early while the moisture supply is still adequate.

Lehew loam, steep phase (20 to 30 percent slopes) (LhE) (capability unit VIIs–1).—This soil is similar to Lehew loam, moderately steep phase, except that the depth to the bedrock is slightly less. It occurs on long, steep, upland slopes with other Lehew soils.

The thin mantle of soil is friable and moderately permeable.

Use and suitability.—About 75 percent of this soil is in thin stands of pine and hardwood trees. The cleared portion is used for pasture or is idle.

This soil is best suited to forest. It is too shallow and too steep for crops. Fair pastures can be maintained, but the carrying capacity is low. Fescue is the best pasture plant. Because of droughtiness, the response to fertilization and management is low.

Lehew loam, very steep phase (30+ percent slopes) (LhF) (capability unit VIIs–1).—This soil is similar to Lehew loam, moderately steep phase, except that the depth to the reddish sandstone and shale bedrock is only about 12 to 14 inches.

Use and suitability.—Almost all of this soil is in forest; less than 1 percent has been cleared. Because it is steep, shallow, and low in fertility, forest is the best use for it.

Lindside Series

The soils of the Lindside series are somewhat poorly drained to moderately well drained but are very productive. They consist of recent stream alluvium derived chiefly from limestone. They are on narrow, nearly level flood plains along creeks and other small streams throughout the limestone belts of the county; a few areas are along the Tennessee River. Many areas are often flooded for short periods.

Lindside soils are associated with Huntington and Melvin soils. They are better drained than Melvin soils and not so well drained as Huntington soils.

These soils are moderately high in fertility and slightly acid to neutral in reaction. Except during wet periods when the water table is near the surface, they are easy to work and have good tilth. The permeability is moderate, and the moisture-supplying capacity is high. Many areas could be improved by artificial drainage; others need protection from excess water that flows from adjacent upland slopes. Erosion is not a problem.

Lindside silt loam (0 to 2 percent slopes) (Ln and Ha) (capability unit IIw–1).—Most of this soil is on bottom lands along creeks and smaller streams that originate in or flow through limestone uplands. A few areas are along the Tennessee River. Most areas are likely to be flooded occasionally. Along many of the smaller streams, this soil occupies the entire flood plain. Where the flood plain is broad, this soil is next to the stream and is normally bordered by strips of Melvin silt loam that are along the outer rim of the flood plain. A description of a representative profile follows.

0 to 14 inches, dark grayish-brown or dark-brown (10YR 4/2 or 4/3) silt loam; weak, medium, granular structure; very friable.
14 to 25 inches, dark-brown (10YR 4/3) fine silt loam; a few yellowish-brown mottles; mottles more numerous in lower part; friable.
25 to 48 inches +, mottled grayish-brown, yellowish-brown, and gray fine silt loam; gray dominant in lower part.

The depth to limestone bedrock is generally more than 5 feet and in some places is as much as 40 feet.

This is one of the most fertile soils in the county. It is moderately high in organic matter. It is generally slightly acid but in some areas is nearly neutral. The water table fluctuates. Tilth is good, except in a few wet spots where the soil is plastic. Heavy farm machinery can be used. Fieldwork is sometimes delayed in the spring by excess moisture and also at times during the growing season by heavy summer rains. Crops may occasionally be damaged by floods during the growing season.

Use and suitability.—Nearly all of this soil has been cultivated. About 35 percent of it is used for corn, 10

percent for small grains, 30 percent for hay, 20 percent for rotation pasture, and 5 percent for miscellaneous crops.

Because of its high moisture-supplying capacity, this soil can be used for crops that require a long growing season. It can be used intensively for row crops. It is well suited to corn (fig. 13) and soybeans but not so well suited to tobacco and truck crops. It is not suited to alfalfa, because the water table is too high, nor to small grains, which commonly lodge. It is very good for hay and pasture. Although naturally fertile, it responds well to fertilizer. It does not require lime.

Lindside silt loam, local alluvium phase (0 to 2 percent slopes) (Lo and Hb) (capability unit IIw–1).—This soil consists of materials washed from adjacent upland slopes and deposited along lateral or intermittent drainageways and in depressions. It is not often flooded, but it does receive runoff and sediments from the surrounding uplands. Normally, the surface soil is dark grayish-brown or dark-brown silt loam about 12 to 15 inches thick. Below this is dark grayish-brown silt loam to silty clay loam somewhat mottled with gray and yellow. At a depth of 24 to 30 inches, the color is dominantly gray and the texture is fine silt loam to silty clay loam. Almost all areas are underlain by limestone, generally at a depth of more than 5 feet.

This soil is moderately high in fertility. It is slightly acid. Because of seepage and runoff from the surrounding uplands, it is excessively wet during rainy periods; consequently, planting dates and cultivation are frequently delayed. This soil is easy to work with machinery. Controlling erosion is no problem.

Use and suitability.—Corn, lespedeza, and small grains are the most common crops. Tobacco is grown on a few areas. Some areas that are very small are used in the same way as the remainder of the field.

This soil is suited to intensive use. If well fertilized, it will give high yields of corn, lespedeza, red clover, timothy, orchardgrass, and white clover. It is not drained well enough for alfalfa. During wet seasons, tobacco is likely to be damaged. Small grains grow well but tend to lodge and to mature late.

***Figure 13.*—Corn for silage on Lindside silt loam; pasture and forest (background) mainly on Talbott and Colbert very rocky soils.**

Litz Series

The Litz series consists of shallow, well-drained, rolling to steep soils that developed over leached shale bedrock. The hills are low, and the slopes are moderately short.

Litz soils are fairly extensive in the narrow shale valleys that cross the county. One of these valleys crosses the county just south of Greenback; another, just north of Eaton Crossroad. These soils are shallower than Sequoia soils, with which they are associated, and have less profile development.

Where uneroded, the surface layer of these soils is yellowish-brown, friable silt loam about 7 inches thick. The subsoil is yellowish-red or strong-brown, shaly silty clay. It extends to the shale bedrock, which is at depths of 12 to 20 inches. These soils are low in fertility. They contain little organic matter. The moisture-supplying capacity is low or very low. The reaction is strongly acid.

These are among the most erosive soils in the county. The soil material is moderately permeable, but, because of the tight-bedded shale bedrock, these shallow soils quickly become saturated. Control of water is a major problem.

Litz silt loam, sloping phase (5 to 12 percent slopes) (LtC) (capability unit IIIs–1).—This soil is on short slopes, mostly in general soil area 3. It lies below areas of Sequoia soils that are on smoother slopes and on the tops of low hills. In most places, the acid shale bedrock is soft and, apparently, leached of lime. In some places it contains a few thin layers, or lenses, of limestone. A description of a representative profile follows.

- A_p 0 to 7 inches, yellowish-brown (10YR 5/4) silt loam containing some fine shale fragments; moderate, medium, granular structure; friable.
- BC 7 to 16 inches, strong-brown (7.5YR 5/6) or yellowish-red (5YR 5/6) silty clay mixed with soft shale fragments.
- D_r 16 inches, fissile shale bedrock.

The depth to bedrock is 1 to 2 feet.

Moisture infiltrates rapidly, but, because the profile is shallow, this soil holds little moisture and runoff starts quickly during rains.

Use and suitability.—About 80 percent of this soil has been cultivated. Because it is shallow, sloping, and low in fertility, it is not well suited to row crops. It will produce small grains, alfalfa, other legumes, and grasses if it is properly fertilized, limed, and seeded. Under good management, permanent pastures of orchardgrass and whiteclover have a fair carrying capacity, but these plants do not grow well during dry periods. Fescue will give higher yields than orchardgrass and is easier to maintain. Yields of row crops cannot be expected to be high because of the low moisture-supplying capacity.

Litz silt loam, moderately steep phase (12 to 20 percent slopes) (LtD) (capability unit IVs–1).—This soil is on some of the stronger slopes in general soil area 3. In most places, it is shallower to shale bedrock than Litz silt loam, sloping phase. On the steep slopes, the shale outcrops in places.

The 5- to 6-inch surface soil is yellowish-brown, friable silt loam. Below this layer is strong-brown or yellowish-red shaly silty clay or shaly silty clay loam. The depth to bedrock ranges from 1 to 1½ feet.

This soil is normally droughty. Because it is shallow and absorbs little water, runoff starts quickly during rains.

Use and suitability.—About 80 percent of this soil has been cultivated. Now a large proportion is in unimproved pasture, 15 to 20 percent is used for general crops, and many areas are idle.

This soil is poorly suited to cultivated crops. If adequately fertilized, it is fair for pasture grasses and legumes. Because it is droughty, its carrying capacity is low.

Litz silt loam, steep phase (20 to 30 percent slopes) (LtE) (capability unit VIIs–1).—This soil is on short, steep slopes in the shale valleys. Normally the profile is about 12 to 14 inches deep, but the shale bedrock outcrops in a few places. The uppermost 4 to 6 inches of the profile is yellowish-brown, friable silt loam. Between this layer and the bedrock is a layer of strong-brown, shaly silty clay loam. Although moderately permeable, this soil is so shallow that its capacity to store and supply moisture is very low. It very quickly becomes saturated during a heavy rain.

Use and suitability.—About half of this soil is in forest; most of the rest is used as unimproved pasture, but some is idle.

This soil is poorly suited to crops. It is too steep and droughty for sustained profitable yields. It is best suited to pasture or forest. Pastures are fair if well fertilized and protected from overgrazing. Although orchardgrass will produce moderate yields, fescue is better suited because it is more drought resistant.

Litz shaly silty clay loam, sloping phase (5 to 12 percent slopes) (LsC) (capability unit IVs–1).—This soil is widely distributed in small areas throughout general soil area 3. Most of it is on short slopes of low ridges, below smoother areas of Litz or Sequoia soils. The shaly silty clay loam surface layer is the result of severe erosion. Soft, shaly bedrock is at the surface in places. The shallow gullies that have formed in some places can normally be filled by ordinary tillage implements.

Use and suitability.—All of this soil has been cultivated. A large part is now used for unimproved pasture. About 30 percent is idle or abandoned. Virginia pine has reseeded naturally in many of the abandoned areas. Small grains, corn, lespedeza, and other crops are grown on about 30 percent of the acreage.

This soil is rather poorly suited to the common row crops. It is better suited to close-growing crops and pasture. If it is adequately fertilized and otherwise well managed, pasture plants grow fairly well. Nearly all of the common pasture plants can be grown. Yields of small grains are fair to good because the grains mature early when rainfall is normally adequate.

Litz shaly silty clay loam, moderately steep phase (12 to 20 percent slopes) (LsD) (capability unit IVs–1).—This soil is widely distributed throughout general soil area 3. It is predominantly yellowish-brown shaly silty clay loam. Shale bedrock generally occurs at depths of 6 inches to 1 foot, but in places the shale outcrops. In some places there are shallow gullies. Although moisture is readily absorbed, the moisture-supplying capacity is very low.

Use and suitability.—All of this soil has been cultivated. About 50 percent is used for unimproved pasture, and probably 30 percent is virtually abandoned or is idle. The rest is used for corn, small grains, and lespedeza.

This soil is poorly suited to crops. If adequately fertilized and limed and properly seeded, most of the acreage can grow fair stands of pasture grasses and legumes, including whiteclover, fescue, and orchardgrass. Drought-resistant pasture plants should be selected.

Litz shaly silty clay loam, steep phase (20 to 30 percent slopes) (LsE) (capability unit VIIs–1).—Erosion has removed almost all of the original surface layer of this soil. The present surface layer consists of the shaly subsoil. There are many outcrops of bedrock. Shallow gullies have developed in some areas; ordinarily these can be filled in by farm machinery. The depth to the acid shale bedrock ranges from a few inches to about a foot. The soil consists of strong-brown or yellowish-red silty clay loam that contains many small shale fragments. It is nearly uniform from the surface to bedrock.

Use and suitability.—Very little of this soil is used for crops. Most of it is in unimproved pasture or is idle. Some is restocking with Virginia pine.

This soil is too droughty, shallow, and erosive to give sustained good yields of either crops or pasture. Forest is the best use for it. Shortleaf pine and loblolly pine are well suited.

Lobelville Series

The soils of the Lobelville series range from moderately well drained to somewhat poorly drained. They are on first bottoms and consist of recent alluvium washed from light-colored, cherty soils of the uplands.

These soils are similar to the Lindside soils but are lighter colored and somewhat cherty.

Lobelville cherty silt loam (0 to 2 percent slopes) (Lu) (capability unit IIw–1).—About half of this soil consists of general alluvium deposited on the narrow flood plains of small streams, and half of local alluvium deposited in long, narrow strips along lateral or intermittent drainageways. Most of the alluvium was washed from Fullerton and Clarksville soils. The relief is nearly level; a few areas are in slight depressions. The areas along the small streams are likely to be flooded for short periods; those along the intermittent drainageways are not flooded, but they do receive seepage and runoff water and sediments from the adjoining upland slopes.

In some places this soil is associated with the Melvin soils, but generally it occupies the entire flood plain. A description of a representative profile follows.

0 to 8 inches, dark grayish-brown (10YR 4/2) cherty silt loam; weak, fine, granular structure; very friable; chert fragments mostly less than 2 inches in diameter.

8 to 15 inches, yellowish-brown (10YR 5/4) or light yellowish-brown (10YR 6/4) cherty silt loam with a few, fine, faint, light brownish-gray (10YR 6/2) mottles; weak, fine, granular structure; friable; chert fragments about ½ to 2 inches in diameter.

15 to 24 inches, light yellowish-brown to pale-brown (10YR 6/4 to 6/3) cherty silt loam to cherty loam with common, medium, light brownish-gray (10YR 6/2) mottles; massive; friable.

24 to 36 inches, light brownish-gray (10YR 6/2) cherty loam with common, medium, light yellowish-brown (10YR 6/4) mottles; massive; friable; underlain by chert gravel.

This soil is friable and moderately permeable. It is more productive than the associated cherty soils on the

uplands. The fertility is moderate. The reaction is medium acid to strongly acid. Excess moisture frequently delays tillage operations. During long spells of wet weather, the water table rises to within 1 or 2 feet of the surface.

Use and suitability.—This soil is used for crops and pasture. Corn and lespedeza are the most common crops.

Since it is nearly level and not subject to erosion, this soil is suited to intensive use. Corn, soybeans, red clover, timothy, orchardgrass, fescue, lespedeza, and white clover will grow well if enough fertilizer and lime are used. Alfalfa and tobacco are not suitable, because of the inadequate drainage. Good pastures can be maintained, even during the drier part of the growing season when the moisture supply in the upland soils is low. All the common pasture plants grow well if adequately fertilized.

Made Land

Made land (Ma) (capability unit VIIs–1).—This miscellaneous land type consists of areas that have been leveled or filled in, or areas where the original soil profiles have been obliterated by construction machinery. Most of the acreage is near Loudon and Lenoir City.

Use and suitability.—Almost none of this land type is used for agriculture. The areas are occupied by drive-in theatres, factories, ball parks, and playgrounds.

Melvin Series

The soils of the Melvin series are poorly drained. They are on first bottoms and consist of recent general alluvium derived mostly from limestone. They occur throughout the county, typically as narrow strips along the rims of the flood plains of small streams or creeks. Most of the acreage is subject to occasional flooding. The relief is nearly level or slightly depressed.

The Melvin soils are associated with the Lindside and Huntington soils but differ from them in being poorly drained.

Melvin silt loam (0 to 2 percent slopes) (Me) (capability unit IIIw–1).—This soil is waterlogged during wet periods, and most of it is subject to flooding during heavy rains. It normally is adjacent to the Lindside soils. A description of a representative profile follows.

- A_p 0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable.
- C_{1g} 7 to 27 inches, light brownish-gray (10YR 6/2) silt loam ranging to silty clay loam in some areas; massive; plastic.
- C_{2g} 27 inches +, light brownish-gray (10YR 6/2) and brownish-yellow (10YR 6/6) silty clay loam or fine silt loam that continues to the fluctuating water table; plastic.

This soil is slightly acid to neutral. It contains moderate amounts of organic matter and plant nutrients. The permeability is moderate to moderately slow. Nevertheless, the water table is at or near the surface during extended rainy periods.

Use and suitability.—Most of this soil is in unimproved pasture; some is in crops, mainly corn. Average yields of corn are low, and failures are common. This soil can be drained easily if suitable outlets are available.

Without artificial drainage, it is probably best suited to summer pasture. Most pasture plants grow well during long dry periods because the soil remains moist. Fescue and whiteclover are suitable pasture plants. Soybeans and grain sorghum produce good yields but are not common in the county.

Minvale Series

The soils of the Minvale series are deep and well drained. They developed in colluvial or local alluvial materials derived mostly from Fullerton and Clarksville soils. They are on undulating to rolling foot slopes, fans, and benches, at the base of the upland slopes from which the parent material washed or rolled. The areas are small to medium-sized and are scattered throughout the part of the county that is underlain by cherty limestone.

Normally these soils have a surface soil of brown silt loam and a subsoil of strong-brown or yellowish-red silty clay loam.

The Minvale soils occur with the Greendale soils, which normally lie along drainageways. They are similar to the Hermitage soils in position and age but are lighter colored throughout. They resemble the Landisburg soils, but they are better drained, they have a reddish B horizon, and they have no fragipan.

These soils are moderate to moderately low in fertility. Their reaction is strongly acid to very strongly acid. They are moderate to moderately low in organic matter. They are moderately permeable and favorable for extensive root development.

Minvale silt loam, gently sloping phase (2 to 5 percent slopes) (MsB) (capability unit IIe–1).—This soil is uneroded to slightly eroded. Over most of the acreage, the plow layer is still within the original surface soil. The slopes are slightly concave. A description of a representative profile follows.

- A_p 0 to 7 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; friable; color ranges to pale brown and yellowish brown.
- A_3 7 to 11 inches, yellowish-brown (10YR 5/6) silt loam; moderate, medium, granular structure; friable.
- B_1 11 to 17 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, fine, subangular blocky structure; friable.
- B_2 17 to 35 inches, yellowish-red (5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; color ranges to strong brown and red.
- B_3 35 to 48 inches, yellowish-red (5YR 5/8) silty clay loam or silty clay with a few, fine, brownish-yellow variegations; finer textured than layer above; strong to moderate, medium, subangular blocky structure; friable; continues to cherty limestone residuum at depths of 3 to 6 feet.

The depth to the limestone bedrock generally ranges from 5 to 20 feet.

This soil has a high capacity for supplying moisture to plants. It has good tilth and is easy to work and to conserve.

Use and suitability.—All or almost all of the acreage has been cleared and farmed (fig. 14). It is used for many kinds of crops and for pasture. Much of it is used for corn, tobacco, and garden crops.

Because of favorable physical properties and high moisture-supplying capacity, this soil responds well to fertilization and management. For high sustained yields, it requires heavy applications of lime, nitrogen, phosphate, and potash. It is suited to all of the common

Figure 14.—**Gently sloping area (foreground) of Minvale and Hermitage soils being used for grain and hay; Fullerton silt loam, steep phase, (background) being used for pasture.**

crops. Rotations can be short because the slopes are gentle and erosion is not difficult to control.

Minvale silt loam, eroded sloping phase (5 to 12 percent slopes) (MsC2) (capability unit IIIe–1).—This soil developed in colluvial deposits more than 3 feet deep. The limestone bedrock is generally at depths of 5 to 20 feet.

The surface soil is brown to yellowish-brown silt loam about 3 to 7 inches thick. It has been mixed with the upper part of the subsoil in places. The subsoil is yellowish-red, moderately friable silty clay loam.

Included with this soil is about 100 acres of soils that developed in materials washed from uplands underlain by shale. This acreage is in small tracts along the base of the upland slopes occupied by the Litz and Sequoia soils.

This soil is low in plant nutrients, but it responds well to amendments. It is easy to work and is not difficult to conserve. Tilth is good and is easy to maintain.

Use and suitability.—Almost all of this soil is cultivated and used for a wide range of crops and pasture. Very little is idle.

This soil cannot be used so intensively as Minvale silt loam, gently sloping phase; it needs longer rotations that include more close-growing crops. It can be tilled throughout a wide range of moisture content. All the common crops grow well, including alfalfa, tobacco, truck crops, and pasture plants.

Minvale cherty silt loam, eroded sloping phase (5 to 12 percent slopes) (MrC2) (capability unit IIIe–1).—This soil developed in colluvial deposits that are about 4 to 6 feet thick over cherty limestone residuum. The depth to bedrock is generally more than 5 feet, and in places it is as much as 30 feet.

In some places the present plow layer of this soil is a mixture of original surface soil and the upper part of the subsoil; in other places the plow layer is still within the original surface soil. There are moderate amounts of chert fragments, mostly less than 3 inches in diameter, on the surface and throughout the profile. The relief is slightly concave.

The natural fertility is low. The moisture-supplying capacity is medium to high. The chert interferes with but does not prevent cultivation.

Use and suitability.—Almost all of this soil is used for crops and pasture. A very small acreage is still in forest, and a small part is idle.

This soil is suited to all the common crops. It is not so well suited to alfalfa as the well-drained, less cherty soils. It is low in calcium, nitrogen, phosphorus, and potassium. The response to fertilization and management is better than average. Controlling erosion is a moderate problem. Row crops should not be grown more often than once every 3 years.

Neubert Series

The soils of the Neubert series are deep, well drained, and productive. They consist of local alluvium or recent colluvium that washed or rolled from the Tellico and Steekee soils. They occur as narrow strips in hollows, along lateral drains, and at the base of upland slopes. Most of the acreage is in general soil area 5, which crosses the southern part of the county.

The Neubert soils occur with the Alcoa soils and differ from them chiefly in having little or no profile development. In many places the profile is almost uniform from the surface to the base of the colluvial or alluvial deposits, which are up to 12 feet thick.

These soils are important to agriculture in Loudon County because they constitute all of the cropland in areas that are dominated by steep, prominent ridges.

These soils are highly fertile. They are high in organic matter. They are friable, easy to work, and easy to conserve. The reaction is medium acid to slightly acid. The moisture-supplying capacity is very high. Permeability is moderately rapid. Tilth is good and is easy to maintain.

Neubert loam (1 to 4 percent slopes) (Ne) (capability unit I–1).—This soil is not ordinarily subject to flooding, but it does commonly receive excessive amounts of runoff and sediment from the adjacent steep slopes. These periodic depositions of sediment replenish fertility, but they are often detrimental to crops. A description of a representative profile follows.

0 to 7 inches, dark reddish-brown (5YR 3/4) loam; weak, fine, granular structure; very friable.
7 to 24 inches, dark reddish-brown (5YR 3/4) loam; weak, medium, granular structure; very friable.
24 to 36 inches +, dark reddish-brown (2.5YR 3/4) fine loam; weak, medium, granular structure.

The depth to the bedrock ranges from 3 to 12 feet. In some places the material below a depth of 30 inches is mottled with yellow and gray. The texture of the profile ranges to fine sandy loam in some areas.

This soil can be cultivated throughout a wide range of moisture content. It is highly responsive to management.

Use and suitability.—Much of this soil is cultivated, some of it intensively. The only parts still under forest are in the extreme upper reaches of the drainageways. About 25 percent of the acreage is in corn, 25 percent in hay, and 25 percent in pasture. A small acreage is used for vegetables, small grains, and tobacco.

This soil is very well suited to many kinds of crops and pasture plants. If adequately fertilized, it can be used intensively for row crops. It will produce high yields of corn, vegetables, and tobacco. Because the moisture-supplying capacity is high, it is valuable for pasture during the drier parts of the growing season.

Nolichucky Series

The Nolichucky series consists of deep, well-drained soils developed in coarse-textured alluvium deposited over cherty dolomitic limestone residuum. These soils are mostly on the high terraces of the Little Tennessee River and are associated with the Waynesboro and Fullerton soils. Many of the areas are on the upper slopes or on the caps of high hills. The relief is dominantly rolling to hilly and moderately dissected.

These soils are characterized by a light-colored, highly leached surface soil and a yellowish-red to red lower subsoil. They are somewhat similar to the Waynesboro soils, differing from them mainly in being lighter colored, particularly in the upper 2 feet, and generally coarser textured. Nearly all of the acreage has rounded or waterworn gravel and cobblestones on the surface and in the soil. Most of the pieces are less than 3 inches in diameter, but a few are between 3 and 5 inches.

The Nolichucky soils are low in natural fertility, are very strongly acid, and contain little organic matter. They are moderately permeable throughout, but the numerous gravel and cobblestones interfere with cultivation, decrease their moisture-supplying capacity, and lower the productivity. Unless protected by vegetation, these soils erode easily.

Nolichucky gravelly fine sandy loam, sloping phase (5 to 12 percent slopes) (NoC) (capability unit IIIe–3).—This soil is distinguished from other Nolichucky soils by rolling topography. It is mainly on the caps of rounded hills, above areas of steeper Nolichucky soils. A description of a representative profile follows.

- A_1 0 to 1 inch, dark grayish-brown (10YR 4/2) gravelly fine sandy loam; weak, medium, crumb structure; very friable.
- A_2 1 to 8 inches, pale-brown (10YR 6/3) or light yellowish-brown (10YR 6/4) gravelly fine sandy loam; weak, medium and fine, granular structure; very friable.
- A_3 8 to 12 inches, yellowish-brown (10YR 5/4) gravelly fine sandy loam; weak to moderate, medium, granular structure; very friable.
- B_1 12 to 18 inches, yellowish-brown (10YR 5/6) gravelly sandy clay loam; weak, fine, subangular blocky structure; friable.
- B_{21} 18 to 24 inches, strong-brown (7.5YR 5/6) gravelly sandy clay loam; moderate, fine and medium, subangular blocky structure; friable.
- B_{22} 24 to 40 inches, yellowish-red (5YR 4/6) or red (2.5YR 4/6) gravelly sandy clay; moderate, medium, subangular blocky structure; friable.
- B_3 40 to 50 inches +, yellowish-red (5YR 4/6) or red (2.5YR 4/6) gravelly sandy clay with a few yellowish-brown variegations; moderate to weak, medium, subangular blocky structure; friable; continues to cherty limestone residuum, which lies at depths ranging from 4 to 10 feet.

The depth to the cherty limestone bedrock may be as much as 40 feet. This profile is in a forested area. In cultivated areas, the A_1 horizon is missing. Erosion ranges from slight to moderate, but the surface soil is gravelly fine sandy loam in almost all places.

Use and suitability.—Nearly half of this soil is in forest. The stands are thin and consist mainly of hardwoods with which a few pines are intermingled. The cleared portion is used mainly for unimproved pasture, and some is idle. The small acreage that is cropped is used mainly for corn and lespedeza.

This soil is suited to most crops, but because it is gravelly and low in natural fertility, its response to management is limited. It is not well suited to alfalfa or to other crops that have high fertility requirements. If heavily fertilized, it will produce moderate yields of corn, small grains, and lespedeza. Yields of orchardgrass and whiteclover are fair to good, but fescue is easier to maintain.

Nolichucky gravelly fine sandy loam, eroded moderately steep phase (12 to 25 percent slopes) (NoD2) (capability unit IVe–2).—This soil is similar to the sloping phase, except that the surface soil is a little thinner. It is chiefly on short, moderately steep side slopes, mostly on high terraces along the Little Tennessee River. A few areas are on the terraces of the Tennessee River.

The properties of the surface layer vary considerably because of cultivation or various degrees of sheet erosion. Over most of the acreage the topsoil is light yellowish-brown gravelly sandy loam that ranges from 4 to 8 inches in thickness. In a few small spots the surface layer is yellowish-brown or strong-brown gravelly sandy clay loam. The surface soil grades to yellowish-red or red gravelly sandy clay at depths of 10 to 20 inches. The depth to the cherty limestone residuum is 3 to 8 feet, and the depth to the cherty limestone bedrock is 5 to 35 feet.

Use and suitability.—About half of this soil is in forest. Most of the rest is used as unimproved pasture. Some areas are idle. The small part in crops is used mainly for corn and lespedeza for hay.

The common row crops can be grown in long rotations. However, without heavy fertilization, all yields are low. Alfalfa and other crops that have high fertility requirements are not well suited. Small grains grow well, and corn yields are moderate to low. Fescue is a well-suited pasture plant and is relatively better suited than orchardgrass and whiteclover. Because of droughtiness, plants that grow late in spring or early in summer give more profitable returns than late-maturing plants.

Quarry

Quarry (Qa) (capability unit VIIs–1).—This unit consists of the pits and dumps where marble, limestone, or barite is quarried. The areas are generally less than 5 acres in size. The largest is probably the area just north of Loudon where limestone is quarried for roadbuilding.

Use and suitability.—Most of the small marble and barite quarries have been abandoned. The dumps or spoil areas normally consist of mixed rock fragments and soil material and are generally bare of vegetation. Because of the steep slopes, revegetation is difficult unless the areas are leveled with heavy machinery.

Robertsville Series

The soils of the Robertsville series are fine textured and poorly drained. They developed in old local alluvium consisting mainly of limestone materials. They are on nearly level or slightly depressed areas, below upland slopes that are occupied by the Fullerton and Clarksville soils. Both internal and external drainage are slow.

These soils have a grayish-brown or brownish-gray silt loam surface soil that is very high in silt and feels floury. The subsoil is gray, dense, massive silty clay loam to clay.

Robertsville silt loam (0 to 2 percent slopes) (Rb) (capability unit IVw–1).—The areas of this soil range from 1 to 5 acres in size. A description of a representative profile follows.

A_p 0 to 8 inches, light brownish-gray (10YR 6/2) or grayish-brown (10YR 5/2) silt loam; weak, medium, crumb structure; friable.
B_{1m} 8 to 16 inches, light-gray (10YR 6/1 to 10YR 7/1) silty clay loam; massive; firm.
B_{2m} 16 to 36 inches, light-gray (10YR 6/1 to 10YR 7/1) silty clay loam to silty clay; massive; breaks to large irregular fragments; firm; may contain numerous black concretions.
C_{1m} 36 inches +, light-gray (10YR 6/1 to 10YR 7/1) silty clay or clay with brown and yellow streakings; massive; firm; may contain numerous black concretions.

This soil is very low in natural fertility. It is very strongly acid. It has very little organic matter. It is very slowly permeable. The moisture supply is erratic; the soil is extremely wet during wet periods and extremely dry during dry seasons. It apparently has little pore space. Because of the slow permeability and lack of suitable outlets, artificial drainage is difficult and expensive.

Use and suitability.—Most of this soil is used for unimproved pasture consisting of volunteer plants common to wet lands. A few small areas are used for corn, small grains, or lespedeza. Yields are low.

Permanent pasture is the best use for this soil. Fescue and whiteclover will grow well if adequately fertilized. Because of the poor drainage, the response to fertilization is not good.

Rockland

Rockland (5 to 40 percent slopes) (Ro))capability unit VIIs–1).—This land type consists mainly of outcrops and loose fragments of limestone. Between the ledges there are small patches of thin, clayey soil. The vegetation is sparse. The forest consists of cedars and scrubby deciduous trees.

Rockland occurs in the clayey limestone belt that crosses the southern part of the county. It commonly occurs with the Talbott soils; in some areas it occurs with Dewey, Decatur, and Farragut soils.

Use and suitability.—This land type is of no use for crops and of very little use for pasture.

Sequatchie Series

The soils of the Sequatchie series are deep, well drained, and fertile. They are among the most productive soils in the county. They formed on low stream terraces in general alluvium derived from many different kinds of material.

A large part of the acreage borders the Little Tennessee and Tennessee Rivers. Most areas are only a few feet above the present first bottoms. Generally, the areas are not susceptible to flooding, but some on the lower part of the terraces of creeks may be flooded during extremely heavy rains.

The Sequatchie soils occur with the Huntington and Congaree soils and differ from them mainly in being a little older and having moderate horizon development.

The Sequatchie soils range from moderately high to high in natural fertility and are medium acid. They have good tilth and are easy to work and to conserve. They are favorable for extensive root development and permeable enough to permit circulation of air and moisture. Their moisture-supplying capacity varies with the texture and slope, but it generally ranges from high to very high. Their response to fertilization and management is high.

Sequatchie fine sandy loam, gently sloping phase (1 to 5 percent slopes) (SaB) (capability unit IIe–1).—This soil is mainly on the low terraces of the Little Tennessee and Tennessee Rivers, normally near Huntington or Congaree soils. The areas are small in size and long and narrow in shape. They lie parallel to the river channels. Flood-control dams upstream on both rivers protect the areas from flooding. Most of the acreage ranges from 1 to 3 percent in slope gradient. A description of a representative profile follows.

A_1 0 to 11 inches, brown to dark-brown (10YR 5/3 to 4/3) fine sandy loam; weak, fine, granular structure; very friable.
B_2 11 to 40 inches, yellowish-brown (10YR 5/4 to 5/6) sandy clay loam; weak, fine, subangular blocky structure; very friable.
B_3 40 to 60 inches, yellowish-brown (10YR 5/4 to 5/6) sandy clay loam; weak, fine, subangular blocky structure, nearly structureless; very friable; a few yellow and gray mottles.

The alluvial deposit is generally not less than 6 feet thick. The depth to the bedrock ranges from 8 to 25 feet.

This soil is moderately high in fertility. It is moderately permeable and easy to keep in good tilth. It can be tilled throughout a wide range of moisture content without injury to tilth or structure. Because it is coarser textured and more porous than the Sequatchie loams, it holds less moisture, but ordinarily it holds enough for high yields. Its low position on the landscape partly offsets the effects of rapid percolation of water.

Use and suitability.—Nearly all of this soil is cultivated. Very little is idle. Many kinds of crops are grown. Corn is the principal crop, but small grains and lespedeza are common.

This soil is well suited to all the common crops. It can be used intensively if well managed. It is less productive than other Sequatchie soils, but it responds to fertilization and management. Moderately high yields can be obtained.

Sequatchie loam, gently sloping phase (1 to 5 percent slopes) (ScB) (capability unit IIe–1).—This soil is associated mainly with the Huntington and Congaree soils. It lies at slightly higher levels and has more profile development than either. Most of the acreage has slopes of 1 to 3 percent. A description of a representative profile follows.

A_1 0 to 12 inches, dark-brown to dark grayish-brown (10YR 3/3 to 4/2) loam; weak, medium, granular structure; very friable.
B_2 12 to 38 inches, yellowish-brown to strong-brown (10YR 5/6 to 7.5YR 4/6) clay loam; weak, fine, subangular blocky structure; very friable.
B_3 38 to 50 inches +, yellowish-brown to strong-brown (10YR 5/6 to 7.5YR 4/6) clay loam faintly mottled with gray and yellow; weak, fine, subangular blocky structure; very friable; alluvial deposits 7 to 20 feet thick.

This is one of the most fertile soils in the county. It has good tilth and is easy to work and conserve. It is moderately permeable and has a high water-holding capacity. It is well aerated, and roots develop rapidly. Runoff is slow; erosion is not much of a problem.

Use and suitability.—All of this soil is cultivated; corn is the most common row crop; small grains and hay are extensively grown.

Because this soil is nearly level, has favorable moisture relations, and responds well to fertilization and other management, it is one of the best soils in the county for crops. It is suited to tobacco, vegetables, alfalfa, and many other crops. If it is kept fertile, it can be used in short rotations or even continuously for row crops. It is well suited to pasture legumes and grasses.

Sequatchie loam, sloping phase (5 to 12 percent slopes) (ScC) (capability unit IIIe–1).—This soil is chiefly on the low terraces along the Tennessee and Little Tennessee Rivers. It is similar to Sequatchie loam, gently sloping phase, except that the texture and thickness of its surface soil are more variable. It occurs on very short slopes, most of which are less than 200 feet long. The areas are small and form long, narrow bands that lie adjacent to the Huntington, Congaree, and other Sequatchie soils. Erosion has removed various amounts of the surface soil. However, very little of the acreage is severely eroded. The present surface layer, 4 to 8 inches in depth, is dark-brown loam to fine sandy loam. A few eroded spots are yellowish-brown clay loam. The subsoil is yellowish-brown or strong-brown clay loam. The alluvial deposit is 6 to 20 feet thick.

This soil is moderately permeable and easy to keep in good tilth. The moisture-supplying capacity is not quite so high as that of Sequatchie loam, gently sloping phase.

Use and suitability.—This soil is used for the common crops and for pasture. Many areas are so small that they are farmed in the same way as the adjacent soils of the first bottoms and the smoother Sequatchie soils.

This soil is well suited to all the common crops. If adequately fertilized and otherwise well managed, it will produce good yields of corn, small grains, hay, and pasture.

Sequoia Series

The soils of the Sequoia series are well drained and moderately deep. They developed in residuum weathered from soft shale that is leached to a depth of several feet. In some places, narrow bands of limestone are interbedded with the shale, but this is not common. The depth to the bedrock ranges from 1½ to 4 feet and is most commonly about 2 feet. The relief is chiefly undulating to rolling.

Many of the areas are on the rounded tops of low, rolling hills next to areas of Litz soils, which are on the side slopes. Together, the Litz and Sequoia soils occupy most of the narrow shale valleys in the county.

The Sequoia soils are deeper than the Litz soils. They have a well-developed B horizon about 15 to 20 inches thick, while the Litz soils have a very thin B horizon, if any, and are only 12 to 18 inches deep.

The Sequoia soils are similar to the Talbott soils in the uppermost 2 feet. The lower part, however, is shaly, whereas the lower part of the Talbott soils is clayey.

These soils are erosive. The natural fertility is low. The reaction is strongly acid. The supply of organic matter is small. Permeability is moderate in the surface soil but moderately slow in the subsoil.

Sequoia silty clay loam, eroded gently sloping phase (2 to 5 percent slopes) (SkB2) (capability unit IIe–3).—This soil is mostly on the smooth tops of low rolling hills in the narrow valleys underlain by shale. Almost all of it is in general soil area 3. In most places, the surface soil is a mixture of the original surface soil and the upper part of the subsoil. This is a result of moderate erosion and subsequent mixing by tillage implements. The depth to the bedrock ranges from 20 to 40 inches. A description of a representative profile follows.

- A_p 0 to 6 inches, yellowish-brown to brown (10YR 5/4 to 4/3) silty clay loam; moderate, medium, granular structure; friable.
- B_1 6 to 12 inches, strong-brown (7.5YR 5/8) silty clay loam; moderate, medium, subangular blocky structure; firm.
- B_2 12 to 26 inches, yellowish-red (5YR 5/8) silty clay; strong, medium and coarse, subangular blocky structure; very firm.
- C_1 26 to 34 inches, yellowish-red (5YR 5/8) silty clay soil material containing numerous soft shale fragments.
- D_r 34 inches, leached shale bedrock.

The texture of the plow layer ranges from silty clay loam to silt loam in some areas; the thickness ranges from 4 to 8 inches.

This soil is moderately low to low in fertility. It is moderately low to low in organic matter. Its moisture-supplying capacity is medium. It will puddle or clod if worked when too wet or too dry; otherwise, it is not hard to keep in good tilth.

Use and suitability.—About 10 percent of this soil is in forest. Most of the rest is used for crops and pasture. A large acreage is in unimproved pasture. Some is idle.

This soil is suited to all the common crops and pasture plants. Yields of most row crops are profitable, though not very high. Yields of alfalfa are good if enough fertilizer is used. Good pastures of legumes and grasses can be developed and maintained. All crops require liberal fertilization. Because of the erosion hazard, control of water is important.

Sequoia silty clay loam, eroded sloping phase (5 to 12 percent slopes) (SkC2) (capability unit IIIe–4).—This soil is in large areas on the slopes of the low ridges in general soil area 3. It generally is shallower than Sequoia silty clay loam, eroded gently sloping phase.

The 5-inch plow layer consists of yellowish-brown silty clay loam. The subsoil is predominantly yellowish-red or strong-brown, firm silty clay. The subsoil merges into mottled reddish-yellow and gray, very firm silty clay that contains a variable amount of partly disintegrated shale fragments. The bedrock of leached or acid shale occurs at depths of 1½ to 2½ feet.

This soil is low in fertility. It contains little organic matter. The moisture-supplying capacity is medium to low, and the soil is rather droughty during the drier parts of the growing season. Because the slopes are moderately strong and the clayey subsoil retards infiltration, runoff starts quickly during rains.

Use and suitability.—Most of this soil has been cultivated. About 15 percent of the acreage is used for corn,

10 percent for small grains, 25 percent for hay, and 25 percent for pasture. Much of the rest is idle.

This soil is suitable for all of the general field crops. Because of the strong slopes and moderately slow permeability, it is not suitable for intensive use and not very desirable for truck crops. Because it is somewhat droughty, yields of late-maturing crops are low and the growth of pasture plants is retarded during the drier parts of the growing period. If this soil is well managed and adequately fertilized, small grains and legumes and grasses, including alfalfa, grow well.

Sequoia silty clay loam, eroded moderately steep phase (12 to 20 percent slopes) (SkD2) (capability unit IVe–3).—This soil is on moderately short upland slopes. It is associated with Litz soils and other Sequoia soils and, in a few places, with Steekee and Tellico soils. In the areas that are near the Steekee and Tellico soils, the texture is more sandy throughout, and the surface soil is almost like loam.

The depth to the soft shale bedrock is about 20 inches. Originally the shale was calcareous, but it is now leached to a depth of several feet.

As a result of moderate erosion and subsequent tillage, some of the subsoil has been mixed with the original surface soil in the plow layer. The top 5 or 6 inches is yellowish-brown silty clay loam; in scattered spots, it is strong-brown silty clay. Beneath the plow layer is a 12- to 14-inch layer of yellowish-red, firm silty clay.

This soil is low in fertility. It contains little organic matter. It erodes very easily; consequently, control of water is a major problem.

Use and suitability.—About 25 percent of this soil is in forest. Most of the rest is used as unimproved pasture. Some is idle. The small acreage that is cropped is used mainly for corn, small grains, and lespedeza for hay.

This soil will produce moderate yields of all the common plants. However, it erodes very easily and should not be used for row crops except in long sequences that consist mostly of sod-forming crops. Because it is moderately shallow, even small erosion losses would destroy its value for either crops or pasture. If not needed for crops, it can be used more profitably as permanent pasture.

Sequoia silt loam, sloping phase (5 to 12 percent slopes) (SeC) (capability unit IIIe–4).—This soil is in very small, scattered areas. It differs from Sequoia silty clay loam, eroded gently sloping phase, chiefly in having a slightly thicker surface soil that is uniformly silt loam and is uneroded.

The natural fertility is moderately low to low.

Use and suitability.—Practically all of this soil is still in forest. It is capable of producing moderate yields of all the common crops and pasture plants, but it would erode easily if cultivated; consequently, row crops should not be grown more than once every 3 or 4 years.

Sequoia silty clay, severely eroded sloping phase (5 to 12 percent slopes) (SlC3) (capability unit IVe–3).—This soil has lost all of its original surface soil and, in places, part of the subsoil. Much of the acreage lies in small areas or in narrow strips on the slopes of the low ridges.

The 5-inch plow layer consists of yellowish-red or yellowish-brown, firm silty clay. The underlying material is similar, but it normally contains soft shale fragments. The shale bedrock occurs at depths of 1 to 2 feet. In some places, the shaly material outcrops. Shallow gullies are common on some of the stronger slopes, but deep tillage would fill in most of them.

This soil is low in fertility. It has very poor tilth. It is droughty because of slow infiltration and very low moisture-supplying capacity. If it is cultivated, much soil material is lost because runoff develops quickly during rains.

Use and suitability.—All of this soil has been cultivated, but much of it is now idle. Some is used for unimproved pasture, and a very small part is cropped. Little fertilizer is used, and yields are low.

This soil is not productive of tilled crops. It produces a fair amount of pasture, if properly fertilized and seeded. All the common pasture plants can be grown. Deep tillage that would break up the shaly material would make the soil more suitable for crops.

Sequoia silty clay, severely eroded moderately steep phase (12 to 20 percent slopes) (SlD3) (capability unit IVs–1).—This soil is on moderately short upland slopes. It is associated with the Litz soils and other Sequoia soils and, in a few places, with the Steekee and Tellico soils. Over most of the acreage the profile consists of yellowish-red, firm silty clay that is almost uniform from the surface to the leached shale bedrock. The depth to the bedrock is normally about 16 to 18 inches, but it is more in some places and less in others. A few shallow gullies have formed in some areas, but ordinary cultivation or deep tillage would fill them in.

This soil is very low in fertility. It contains very little organic matter. It erodes easily unless it is well protected. The moisture-supplying capacity is low. Good tilth is difficult to maintain.

Use and suitability.—Much of this soil is idle or is used as unimproved pasture. A small proportion is used for corn, small grains, and hay crops, chiefly lespedeza.

This soil is poorly suited to crops because it is steep, shallow, and droughty. Its response to fertilization and other management is poor. If well fertilized and protected from overgrazing, it will produce fair to good permanent pasture of fescue and other drought-resistant plants.

Steekee Series

Almost all of the soils of the Steekee series are in general soil area 5, which is known locally as the Red Knobs. These soils developed over two slightly different kinds of rock: massive, calcareous sandstone and blocky, sandy shale.

The Steekee soils are only about 18 inches deep over the bedrock. The relief ranges from sloping to very steep but is dominantly steep or very steep.

These soils occur with the Tellico soils. They are similar to the Litz soils in depth, but they are redder and coarser textured. Except for forestry, they are not important to the agriculture of the county.

These soils are moderate in fertility and medium to strong in acidity. They contain a moderate amount of organic matter. They are friable, moderately permeable, and well drained. They are very erodible.

Steekee loam, moderately steep phase (12 to 20 per-

cent slopes) (StD) (capability unit IVs–1).—Most of this soil is on moderately long slopes, but some areas are on narrow, winding ridge crests. A description of a representative profile follows.

A_1 0 to 8 inches, reddish-brown (5YR 4/3) loam; weak, fine, granular structure; very friable.
BC 8 to 18 inches, reddish-brown (5YR 4/3) loam; weak, fine, angular blocky structure; very friable; a few blocky sandstone and sandy shale fragments that are soft and partially weathered.
D_r 18 inches +, sandstone bedrock.

The depth to the bedrock is quite variable, depending, in part, upon the extent of erosion. There are small spots where the bedrock outcrops and others where the depth is as much as 20 or 24 inches. The color and texture are fairly uniform, regardless of the depth of the soil or the degree of erosion.

This soil has a low moisture-supplying capacity. Because it is so shallow, it quickly becomes saturated with water.

Use and suitability.—Very little of this soil is used for crops. Some is used for unimproved pasture, but most of it is in forest or is idle. Some of the forest is second-growth pine on areas that were formerly cultivated and abandoned.

This soil will produce most of the common plants, but it is so erosive that it should not be used very often, if at all, for cultivated crops. Yields would not be high, because of droughtiness and shallowness. Pasture and forest are more profitable uses. Pastures are fair if well fertilized and protected from overgrazing.

Steekee loam, very steep phase (20+percent slopes) (StF) (capability unit VIIs–1).—This soil is on long, upland slopes. Almost all of it is in the narrow Red Knobs belt that crosses the county near Meadow. The depth to the calcareous sandstone or sandy shale bedrock is normally about 15 inches but ranges from 10 to 18 inches.

This soil is reddish-brown, very friable loam that is almost uniform from the surface to the bedrock. In some areas the texture is more like fine sandy loam.

Use and suitability.—About half of this soil is in forest. The rest is used chiefly for unimproved pasture. Some is idle. This soil is too steep and too erosive to be suitable for crops. The most profitable use for it is permanent pasture or forest. Fair pastures of fescue and other drought-resistant plants can be established and maintained if moderate amounts of fertilizer are applied and if grazing is carefully controlled.

Steekee shaly loam, very steep phase (20+percent slopes) (SvF) (capability unit VIIs–1).—This soil is very shallow. The depth to the bedrock ranges from a few inches to about a foot. However, the bedrock outcrops in many places. The thin mantle of soil is reddish-brown shaly loam to shaly fine sandy loam. The sandstone and shale fragments are mostly soft and partly weathered. Almost all of the acreage is severely eroded, and shallow gullies have developed in some areas.

Use and suitability.—About 70 percent of this soil is in forest consisting, in many places, of second-growth pine. The cleared areas are used chiefly for unimproved pasture. Some are idle.

This soil is too shallow and too steep for crops or pasture. It can best be used for forest. Shortleaf pine and loblolly pine grow well.

Taft Series

The soils of the Taft series are light colored and somewhat poorly drained. They developed in alluvial materials washed chiefly from the Fullerton and Clarksville soils, which developed over limestone. They are on nearly level to slightly depressed areas, below upland slopes occupied by the Fullerton and Clarksville soils and just above areas of the poorly drained Robertsville soils.

These soils are low in fertility and very strongly acid. They contain little organic matter. They are slowly permeable. They become saturated during extended rainy periods. Their moisture supply is erratic; in dry weather it is low. The lower part of the subsoil (fragipan) is compacted and has little pore space.

Taft silt loam (0 to 2 percent slopes) (Ta) (capability unit IVw–1).—The areas of this soil range from 1 to 3 acres in size. A description of a representative profile follows.

A_2 0 to 8 inches, grayish-brown (10YR 5/2) or pale-brown (10YR 6/3) silt loam; weak, fine, granular structure; friable.
B_2 8 to 20 inches, brownish-yellow (10YR 6/6) silty clay loam; a few light-gray and strong-brown mottles; weak, medium, angular blocky structure; firm.
B_{3m} 20 to 40 inches, mottled light-gray, yellow, and yellowish-brown silty clay loam or silty clay; massive; firm; a few black concretions; breaks into large irregular fragments.
C_m 40 inches +, light-gray silty clay mottled with yellow and brown; massive; firm; a few small black concretions and a few small chert fragments.

Use and suitability.—This soil is used for corn, hay, and pasture. Many areas are very small and are used in the same way as surrounding soils.

Because of slow internal drainage, this soil is not suited to alfalfa, tobacco, or most vegetable crops. It will produce fair to good yields of most other crops and of pasture plants if it is well fertilized.

Talbott Series

The soils of the Talbott series are fine textured and moderately deep. The parent rock is clayey limestone. Most of the acreage is in one area that crosses the southern part of the county, just north of Meadow.

The relief is mostly rolling to hilly; the slope range is 5 to 30 percent. The slopes are moderately short, and sinkholes, or depressions, are common.

Where uneroded, these soils have a brown silt loam surface soil and a yellowish-red, very firm clay subsoil. The depth to the bedrock is variable but is ordinarily about 2½ feet. Outcrops are common.

The Talbott soils are redder and deeper than the Colbert soils, with which they are associated.

These soils are low in fertility. They are medium acid to strongly acid. They contain little organic matter. Their subsoil is fine textured, and permeability is moderately slow. The moisture-supplying capacity ranges from medium to very low. In eroded areas, the tilth is poor and good structure is difficult to maintain.

Talbott silty clay loam, eroded sloping phase (5 to 12 percent slopes) (TbC2) (capability unit IIIe–4).—Most of this soil is moderately eroded, and the surface layer includes some subsoil material. A description of a representative profile follows.

A_p 0 to 5 inches, brown (10YR 4/3) or yellowish-brown (10YR 5/4) silty clay loam; moderate, medium, granular structure; friable.
B_1 5 to 9 inches, yellowish-red (5YR 4/6) silty clay loam; moderate, fine, blocky structure; firm.
B_2 9 to 24 inches, yellowish-red (5YR 4/6) clay; strong, coarse, subangular blocky structure; very firm.
B_3 24 to 40 inches, yellowish-red (5YR 4/6) clay with some brownish-yellow or yellowish-brown variegations; strong, coarse, blocky structure; very firm.
D_r 40 inches, argillaceous limestone bedrock.

The depth to the bedrock is generally 3 to 5 feet, but in places it is as much as 8 feet. In a few small spots the subsoil is exposed.

Included with this soil are a few areas—about 100 acres in all—that are not materially eroded. These inclusions have a friable silt loam surface soil about 8 inches thick. Other inclusions that total about 103 acres have slopes of 2 to 5 percent. These inclusions are mainly on the hilltops.

The plastic subsoil impedes the penetration of roots and the movement of moisture and air. Roots do penetrate the subsoil, but slowly. The moisture-supplying capacity is low because the clay tightly holds much of the absorbed water. Except where the surface soil is silt loam and is more than 5 inches thick, tilth is poor. Water is absorbed at a moderate to slow rate, and runoff starts quickly during heavy rains.

Use and suitability.—About 90 percent of this soil has been cultivated; 10 percent is under a cutover forest of hardwood and redcedar trees. About 50 to 60 percent of the acreage is used for pasture, much of which is unimproved; about 20 percent is used for hay and small grains; 15 percent is used for row crops, chiefly corn; and the rest is idle.

All row crops common to the area can be grown. Because of the clayey, plastic subsoil and the risk of erosion, however, close-growing crops are better suited. Suitable crops include small grains, alfalfa, red clover, lespedeza, white clover, orchardgrass, and fescue.

Talbott silty clay, severely eroded sloping phase (5 to 12 percent slopes) (TcC3) (capability unit IVe–3).—This soil has lost nearly all of its original surface soil and, in places, part of its subsoil. The plow layer is yellowish-red or strong-brown, firm, plastic silty clay. It is underlain by yellowish-red, very firm, plastic clay. The limestone bedrock occurs at depths of 1½ to 5 feet, but there are scattered outcrops. Some areas have small shallow gullies, most of which can be crossed by heavy machinery. About 20 acres are included that have slopes of 2 to 5 percent.

The clayey texture of this soil retards infiltration, and runoff develops very quickly during rains. In some places this soil is not easily eroded, but runoff quickly washes away the loose material in cultivated areas. Tilth is very poor, and the moisture-supplying capacity is low.

Use and suitability.—All of this soil has been cultivated. At present a small part is cropped, but a very large part is used for unimproved pasture or is idle.

This soil is poorly suited to row crops. If properly fertilized and seeded, it will produce fair stands of legumes and grasses for pasture. Because of the low moisture-supplying capacity, plants stop growing in dry weather.

Talbott silty clay, severely eroded moderately steep phase (12 to 20 percent slopes) (TcD3) (capability unit IVe–3).—This reddish, plastic soil is associated with the Colbert soils, other Talbott soils, and Rockland. Erosion has removed practically all of the original surface soil and, in places, part of the subsoil. The surface soil ranges from yellowish-brown to yellowish-red, firm silty clay. Beneath this is yellowish-red, extremely firm clay. Shallow gullies have formed in some areas, and the bedrock outcrops in a few places. About 175 acres have a silty clay loam to silt loam surface soil that ranges from 4 to 7 inches in thickness.

This soil absorbs water slowly and has little capacity for holding available moisture. The growth of roots is restricted, especially for annuals and other plants that have fast-growing roots.

Use and suitability.—All of this soil has been cultivated. Much of it is now idle or is used for unimproved pasture. Many abandoned areas are reverting to forest of cedars and hardwoods. About 10 percent is in permanent pasture.

Because this soil has been severely injured by erosion, it is not suited to tilled crops. Its best use probably is permanent pasture. Because it is droughty, pasture yields are not high. If it is fertilized and protected from overgrazing, most of the common pasture plants can be grown. Fescue, bermudagrass, whiteclover, and sericea lespedeza are suitable plants.

Talbott and Colbert very rocky soils, 5 to 25 percent slopes (Td) (capability unit VIIs–1).—Much of this mapping unit is in scattered areas in a narrow belt across the southern part of the county, in association with other Talbott and other Colbert soils. Small areas are scattered throughout the limestone valleys, in association with the Farragut, Fullerton, Dewey, and Decatur soils.

Enough outcrops of limestone occur in these soils to prevent tillage, but there is also enough soil material to produce a fair amount of pasture (fig. 15). About 10 to 40 percent of the surface is covered by outcrops. Between the rocks, the soil material to a depth of 4 or 5 inches is brown or yellowish-brown silty clay loam. The subsoil is yellowish-red or reddish-yellow, firm silty clay

Figure 15.—**Talbott and Colbert very rocky soils (foreground), eroded Litz soil on low hill between cedars and wooded ridge, and cherty Fullerton soil on wooded ridge.**

or clay. In most areas, the soil material is similar to that of the Talbott soils.

The soil material is moderately fertile and medium acid. Tilth is poor. Moisture infiltrates slowly. The moisture-supplying capacity is low.

Use and suitability.—About 75 percent of the acreage has been cleared. It is used chiefly for permanent pasture of volunteer plants and some bluegrass and whiteclover. Most areas have many weeds and sprouts.

Although some patches can be cultivated with hand implements, these droughty soils are poorly suited to crops. Fair stands of bluegrass and whiteclover, which can be improved by fertilization, will grow on most areas.

Tellico Series

The Tellico series consists of deep, well-drained soils that developed in residuum derived from calcareous, red sandstone. In a few places, the bedrock is sandy shale.

These soils are associated with the Steekee soils in the belt of highly dissected, steep upland that crosses the southern part of the county. This area is known locally as the Red Knobs. The Tellico soils are much deeper than the Steekee soils. The depth to the bedrock generally ranges from 3 to 6 feet.

Most of the Tellico soils are moderately fertile and medium to strongly acid. They contain a moderate amount of organic matter. They are moderately permeable and very erosive.

Tellico loam, eroded sloping phase (5 to 12 percent slopes) (TlC2) (capability unit IIIe–2).—Most of this soil is in narrow, irregular strips on the crests of rather high ridges. Steeper Tellico soils are on the ridge slopes. Some of the strips are fairly wide. A description of a representative profile follows.

- A_1 0 to 8 inches, dark reddish-brown (2.5YR 3/4) loam; weak, medium, crumb structure; very friable.
- B_1 8 to 17 inches, dark reddish-brown (2.5YR 3/4) clay loam; weak, fine, angular blocky structure; very friable.
- B_{21} 17 to 39 inches, dark-red to dark reddish-brown (10R 3/6 to 2.5YR 3/4) fine clay loam; weak, fine and medium, angular blocky structure; friable.
- B_{22} 39 to 60 inches, dark-red (2.5YR 3/6) fine sandy clay; moderate, medium, subangular blocky structure; friable.
- C_1 60 to 76 inches, dark-red (2.5YR 3/6) sandy clay with common, medium, yellowish-brown variegations; weak, medium, subangular blocky structure; friable.

The depth to the bedrock ranges from 3 to 8 feet. Below a depth of 42 inches, the material is slightly lighter colored than that above. In many places, the bedrock consists of weak-structured or partly disintegrated, brown and yellow sandy shale. In these places, the soil is slightly lighter colored and is 3 to 4 feet deep. In forested areas, the loam surface layer is 8 to 9 inches thick, and the uppermost 2 inches is stained dark with organic matter. The texture of the surface soil ranges from loam to fine sandy loam.

This soil has medium to high moisture-supplying capacity. Its favorable tilth is easy to maintain. Although it is susceptible to erosion, it is not difficult to conserve because the slopes are not strong and rainfall is absorbed rapidly.

Use and suitability.—About 80 percent of this soil is cultivated. The rest is under a cutover forest of hardwoods and pine.

This soil is well suited to row crops, hay, and pasture. It is particularly well suited to vegetable crops because of the good tilth. Many kinds of field crops can be grown in 3- and 4-year rotations.

Tellico loam, eroded moderately steep phase (12 to 20 percent slopes) (TlD2) (capability unit IVe–1).—This soil is in many medium-sized areas on fairly long ridge slopes below the ridge crests occupied by Tellico loam, eroded sloping phase. Most of the acreage is moderately eroded, and small amounts of subsoil material have been mixed with the original surface soil through tillage.

The present surface soil is dark reddish-brown, very friable loam. The subsoil is dark-red or dark reddish-brown, friable clay loam or sandy clay. The sandy bedrock occurs at depths of 2½ to 7 feet.

In some places, the bedrock consists of partly disintegrated sandy shale. In these places, the soil is shallower than in areas where it overlies massive, calcareous sandstone. The depth to the bedrock is generally greater on the south- and east-facing slopes than it is on the north- and west-facing slopes. In forested areas, the surface soil is 7 to 8 inches thick, and the uppermost 2 inches is stained dark with organic matter.

This soil has a medium moisture-supplying capacity. It has moderately rapid runoff and is highly susceptible to erosion, particularly gully erosion.

Use and suitability.—About 80 percent of this soil is used for general field crops and pasture. The rest is in cutover hardwood forest.

This soil is suited to row crops, hay, and pasture. It is suited to all the common crops if 5- or 6-year rotations are used. Because it warms earlier than the silty soils, it is suitable for crops that are planted early in spring. If properly seeded and fertilized, it will produce any of the common grasses and legumes.

Tellico loam, eroded steep phase (20 to 30 percent slopes) (TlE2) (capability unit VIe–1).—This loamy soil is on the long slopes of fairly high ridges. The surface soil is dark reddish-brown, friable loam. The subsoil is dark-red or dark reddish-brown, friable clay loam or sandy clay. The bedrock occurs at depths of 2 to 6 feet.

This soil contains moderate amounts of plant nutrients and organic matter. Runoff develops quickly during rains; consequently, the risk of erosion, particularly gully erosion, is high.

Use and suitability.—Most of this soil has been cultivated. A large part is now used for unimproved pasture. About 15 percent is used for crops, chiefly corn and lespedeza. Some is idle.

This soil is not suited to row crops. If enough fertilizer is used and if grazing is carefully controlled, fair pasture can be maintained. Unless the need for pastureland is great, the best use for this soil is forest.

Tellico loam, very steep phase (20+ percent slopes) (TlF) (capability unit VIIe–1).—This soil occurs in large areas on the steepest parts of the long slopes in general soil area 5. The 6-inch surface layer is reddish-brown, very friable loam. The underlying material is dark-red, friable, sticky clay loam or sandy clay. The bedrock is at depths of 2 to 3 feet.

This soil contains some organic matter. Because of the steep slopes, it has rapid runoff and is very erodible.

Use and suitability.—Nearly all of this soil is in cutover, deciduous forest. It is poorly suited to crops and pasture and is best used for forest.

Tellico clay loam, severely eroded sloping phase (5 to 12 percent slopes) (TgC3) (capability unit IVe–3).—This soil has a surface soil of dark reddish-brown to dark-red, friable clay loam and a subsoil of dark-red, friable sandy clay. The depth to the bedrock ranges from 2½ to 8 feet. A few shallow gullies have formed in some areas.

This soil has a slightly lower moisture-supplying capacity than the eroded sloping phase of Tellico soils. It is friable but erodes rather easily when cultivated.

Use and suitability.—Unimproved pasture is the most common use for this soil. A small part is used for corn, small grains, and lespedeza for hay. A few areas have reverted to forest.

This soil can be used for crops, pasture, or forest. It erodes rather easily, so row crops should be grown only in long cropping sequences.

Tellico clay loam, severely eroded moderately steep phase (12 to 20 percent slopes) (TgD3) (capability unit IVe–3).—This soil is on fairly long slopes. Erosion has removed almost all of the original loam surface soil, and the surface layer is now dark-red clay loam. This layer is underlain by similar material that grades with increasing depth to a lighter red. The bedrock occurs at depths of 2 to 6 feet. Many areas are gullied. Some of the gullies are deep and difficult to obliterate or stabilize (fig. 16).

This soil is low in fertility and is strongly acid. It is low in organic matter. It has poorer tilth than have the less severely eroded Tellico soils, and it absorbs water more slowly. Its moisture-supplying capacity is medium to low. Runoff is rapid, and the control of erosion, particularly gully erosion, is difficult.

Use and suitability.—All of this soil has been cultivated. About 50 percent is now used for unimproved pasture, some is idle, and about 20 percent has reverted to forest of Virginia pine. A small acreage is used for corn, small grains, and improved permanent pasture.

This soil is poorly suited to row crops. It is better suited to hay and pasture plants. If properly seeded and fertilized, it produces fair yields of the common hay and pasture plants. Row crops can be grown, but the risk of erosion is very high.

Tellico clay loam, severely eroded steep phase (20 to 30 percent slopes) (TgE3) (capability unit VIe–1).—Erosion has removed the original surface layer of this soil, and the surface layer now is dark-red or dark reddish-brown clay loam. The subsoil is dark-red or dark reddish-brown, friable clay loam or sandy clay. The depth to the sandy bedrock ranges from 3 to 5 feet, but bedrock outcrops in places. Many areas have gullies, some of which are deep and difficult to obliterate.

This soil is low in fertility. It contains little organic matter. It has very rapid runoff and is rather droughty. It is extremely susceptible to further erosion, particularly gully erosion.

Use and suitability.—All of this soil has been cultivated. A notable part has reverted to pine, and most of the rest is used for unimproved pasture or is idle. A very small acreage is used for crops.

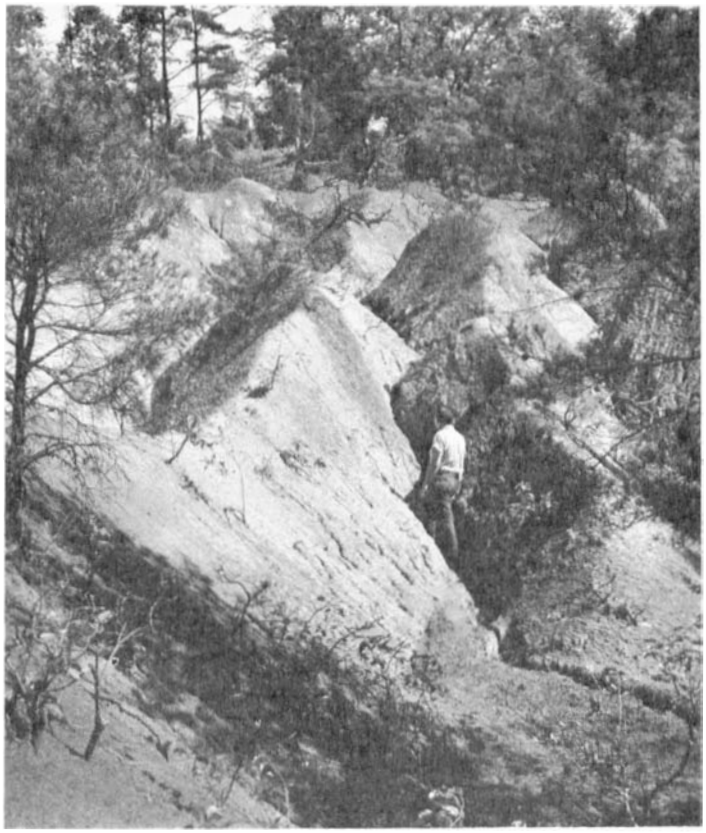

***Figure 16.*—Gullies caused by overcropping the steep, very erosive Tellico soils.**

This soil is poorly suited to crops or pasture. Areas that must be used for pasture need to be limed, heavily fertilized, properly seeded, and carefully managed. The best use probably is forest.

Tellico clay loam, severely eroded very steep phase (20+ percent slopes) (TgF3) (capability unit VIIe–1).—This soil lies on very steep slopes of prominent ridges. It is moderately deep to deep. The depth to bedrock ranges from 2 to 4 feet. Some areas have shallow gullies. The present surface soil, which is primarily subsoil material, is dark-red or dark reddish-brown clay loam. The subsoil is dark-red clay or sandy clay.

This soil contains little organic matter. Because of the steep slopes, it has very rapid runoff and is rather droughty. It is extremely susceptible to further erosion, particularly gully erosion.

Use and suitability.—A large part of the acreage is in second-growth forest. The rest is used mainly for pasture.

This soil is very highly erosive; it cannot be maintained if cropped. Even if used for pasture, it is very difficult to protect from severe erosion. Its most profitable use is forest.

Waynesboro Series

The soils of the Waynesboro series are deep and well drained. They developed in general alluvium underlain at depths of 4 to 20 feet by limestone or shale. Most areas are 50 to 200 feet above the present flood plains, on

the high terraces along the Tennessee and Little Tennessee Rivers. The relief is dominantly rolling to hilly but ranges from undulating to steep.

These soils have a surface soil of brown loam and a subsoil of red to dark-red clay loam to sandy clay. In some areas they have much gravel throughout the profile. They are commonly associated with the Cumberland soils and differ from them in being lighter colored and slightly coarser textured throughout. They are redder than the Nolichucky soils.

These soils are strongly acid in reaction. They are moderately permeable and, where not severely eroded, have good tilth and are easy to work. They are important to the agriculture of the county.

Waynesboro loam, eroded gently sloping phase (2 to 5 percent slopes) (WlB2) (capability unit IIe–2).—Most of this soil is in small areas on the rounded hilltops. The parent material was mixed alluvium derived from limestone, shale, and sandstone. The plow layer, in most places, is a mixture of original surface soil and subsoil. A description of a representative profile follows.

A_p 1 to 7 inches, yellowish-brown (10YR 5/4) to brown (10YR 4/3) loam; weak, fine, granular structure; very friable.
A_3 7 to 11 inches, strong-brown (7.5YR 5/6) loam; weak, fine, subangular blocky structure; friable.
B_1 11 to 16 inches, red (2.5YR 5/8) clay loam; moderate, fine, subangular blocky structure; friable.
B_{21} 16 to 27 inches, red (2.5YR 4/8) sandy clay; moderate, medium, subangular blocky structure; friable.
B_{22} 27 to 38 inches, red (2.5YR 4/8) sandy clay; moderate, medium, angular blocky structure; friable.
B_3 38 to 50 inches, red (2.5YR 4/6) sandy clay or clay loam; weak, medium, angular blocky structure; friable; common, fine, strong-brown variegations.
C_1 50 to 60 inches, variegated red, strong-brown, and reddish-yellow clay loam; weak, medium, angular blocky structure; friable.

This moderately fertile soil contains a moderate amount of organic matter. It has moderate internal drainage and a moderately high moisture-supplying capacity. It can be cultivated throughout a fairly wide range of moisture content.

Use and suitability.—Nearly all of the acreage has been cultivated. Most of it is used for corn, small grains, lespedeza hay, tobacco, and other field crops. Some alfalfa is grown.

This soil is well suited to all of the general farm crops, including alfalfa and various truck crops. It responds well to fertilizer and can be used in moderately short rotations, although the more strongly sloping parts are somewhat likely to erode. If properly fertilized, it produces good pastures of suitable grasses and legumes.

Waynesboro loam, sloping phase (5 to 12 percent slopes) (WlC) (capability unit IIIe–2).—This soil is similar to Waynesboro loam, eroded gently sloping phase, except that the surface layer is 8 to 10 inches thick and the uppermost 2 inches contains more organic matter.

Use and suitability.—Almost all the acreage is now in native hardwood forest. This soil is well suited to crops, pasture, and forest. All the common row crops can be grown if 3- or 4-year rotations are used.

Waynesboro loam, eroded sloping phase (5 to 12 percent slopes) (WlC2) (capability unit IIIe–2).—This soil is moderately fertile. It has medium to high moisture-supplying capacity. Good tilth is easy to maintain.

Use and suitability.—This soil is used for many kinds of crops and pasture. It is well suited to the common crops of the area. If it is well fertilized, yields are generally high. All of the common hay and pasture plants can be grown, including alfalfa and red clover.

Waynesboro loam, eroded moderately steep phase (12 to 25 percent slopes) (WlD2) (capability unit IVe–1).—This soil is on short slopes of high stream terraces. It is a little more eroded than Waynesboro loam, eroded gently sloping phase, and is shallower to the bedrock.

The surface layer consists of 6 inches of brown, friable loam. It is underlain by red to dark-red, friable clay loam. The depth to the limestone or shale bedrock ranges from 3 to 15 feet. There are a few waterworn pebbles or cobblestones in some areas, but they do not interfere with cultivation.

Included are areas totaling 140 acres that are almost completely uneroded. These areas have a surface soil of brown, friable loam about 8 or 9 inches thick.

This soil is moderately fertile. It has medium moisture-supplying capacity and is highly susceptible to erosion. Good tilth is easy to maintain.

Use and suitability.—Nearly all of this soil has been cultivated. Much of it is now used for pasture. About 25 percent is used for crops, chiefly corn and hay. A small part is idle.

This soil is suited to crops and pasture. If it is adequately fertilized and properly seeded, it will provide good pasture. Because of the strong slopes and the risk of erosion, however, it should be kept in close-growing crops much of the time, and long crop rotations should be used. Yields are moderate.

Waynesboro loam, eroded steep phase (20 to 30 percent slopes) (WlE2) (capability unit VIe–1).—This soil is on moderately short, steep slopes. The soil layers are thinner and the total depth is less than in Waynesboro loam, eroded gently sloping phase. The surface soil, which in most places consists of a mixture of surface and subsoil material, is brown, friable loam that ranges from 4 to 6 inches in depth. The subsoil is red to dark-red, friable clay loam or sandy clay. The depth to the limestone or shale bedrock generally ranges from 3 to 14 feet.

Included are severely eroded areas, totaling about 160 acres, that have a strong-brown to red clay loam surface soil. A small acreage—about 85 acres in all—is practically uneroded and has a brown loam surface soil about 8 inches thick.

This soil is moderate to moderately low in fertility. It is moderate to moderately low in organic matter. Its capacity to supply moisture is medium. Runoff is rapid because of the strong slopes. The erosion hazard is high.

Use and suitability.—Pasture is the main use for this soil. A few areas are in crops, chiefly corn, small grains, and lespedeza, and a few areas are idle. About 15 percent is in forest.

Because of steep slopes, this soil is poorly suited to crops. It will produce good pastures if adequately fertilized. All of the common pasture plants can be grown.

Waynesboro gravelly loam, eroded sloping phase (5 to 12 percent slopes) (WgC2) (capability unit IIIe–3).—This soil has many waterworn pebbles and cobblestones on the surface and in the soil (fig. 17). The areas are small. Most of them are on the rounded tops of hills.

Erosion has removed some of the original surface soil in most places, and the present surface layer includes a

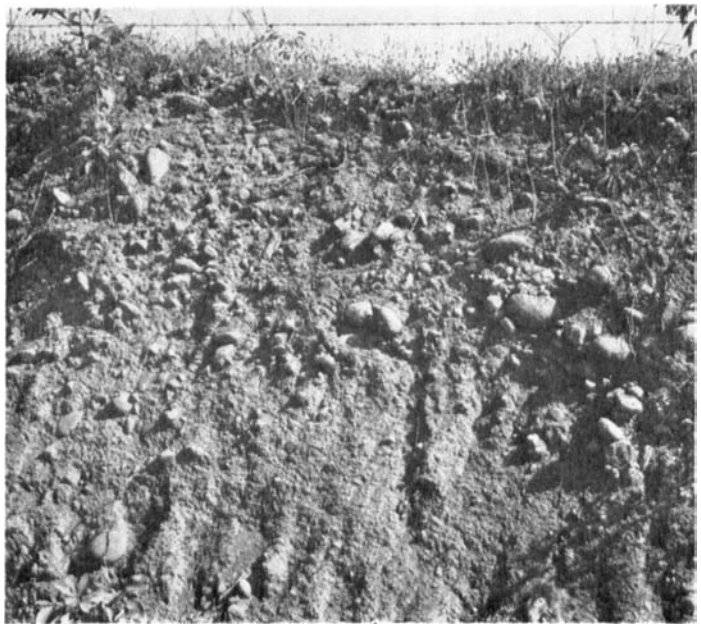

Figure 17.—**Profile of Waynesboro gravelly loam.**

small amount of subsoil material that has been mixed with the surface soil by tillage. The plow layer is yellowish-brown, friable gravelly loam about 5 to 7 inches thick. The subsoil is red gravelly clay loam. The alluvial deposit is underlain by cherty limestone residuum at depths of 3 to 8 feet. The depth to the limestone bedrock ranges from 5 to 25 feet. A few areas are underlain by shale at depths of 3 to 6 feet. Included is about 140 acres that is practically uneroded and has 8 to 9 inches of surface soil.

The fertility is low. The moisture-supplying capacity is moderate to low because of the gravel. The gravel also interferes with but does not prevent cultivation. Workability is rather poor.

Use and suitability.—About 20 percent of this soil is in hardwood forest. The rest is used for crops and pasture.

This soil will produce moderate yields of all the common plants. It will erode; consequently, it should not be cultivated more often than once every 3 or 4 years. Fertilizer requirements are fairly high, and the moisture-supplying capacity is not sufficient for high yields of most plants.

Waynesboro gravelly loam, eroded moderately steep phase (12 to 20 percent slopes) (WgD2) (capability unit IVe–2).—This soil lies on the short, moderately steep slopes below Waynesboro gravelly loam, eroded sloping phase. The surface soil is a little thinner, and the depth to the limestone residuum is less. The plow layer is yellowish-brown to brown gravelly loam. The subsoil is red gravelly clay loam. The alluvial deposit is underlain by cherty limestone residuum—yellowish-red, cherty clay—at depths of 3 to 7 feet. The depth to the limestone bedrock is normally between 5 and 25 feet. In the few areas underlain by shale, the depth to bedrock is only 3 to 5 feet. Small spots can be found where there are only remnants of alluvium and the limestone residuum is nearly at the surface. The alluvial material is generally shallowest on the lowest parts of the slopes.

This soil is low in fertility. It is low in organic matter. The gravel makes it droughty and difficult to work. Runoff is fairly rapid, and the erosion hazard is high.

Use and suitability.—Nearly half of this soil is in forest. The rest is used for crops and pasture, mainly pasture.

The common crops can be grown, but the moisture-supplying capacity is too low for high yields of most crops. If enough fertilizer is used, moderate yields can be expected. Pasture yields are fairly high because pasture plants can utilize the limited moisture supply.

Waynesboro gravelly loam, eroded steep phase (20 to 30 percent slopes) (WgE2) (capability unit VIe–2).—This soil is on short, steep slopes. It developed from old alluvium. The surface soil is yellowish-brown to brown gravelly clay loam from 4 to 8 inches thick. The subsoil is red gravelly clay loam or gravelly sandy clay. Most areas are underlain by cherty limestone residuum at depths of 2 to 5 feet and by limestone bedrock at depths of 5 to 25 feet.

The fertility of this soil is low. The runoff is rapid because of the strong slopes. The waterworn pebbles and cobblestones are so numerous that they reduce the moisture-supplying capacity and make the soil difficult to work.

Use and suitability.—About 15 percent of this soil is in forest. The remainder is used mainly as unimproved pasture, but some is idle.

The slopes are too steep to be suitable for crops. Fair to good pasture can be maintained by adequate fertilization and good management. All the common pasture plants can be grown.

Waynesboro gravelly clay loam, severely eroded moderately steep phase (12 to 20 percent slopes) (WkD3) (capability unit VIe–2).—This soil is on short, moderately steep slopes that lie below areas of Waynesboro gravelly loam, eroded sloping phase. Erosion has exposed the subsoil in most places. There are shallow gullies in some areas.

The surface soil is yellowish-brown to yellowish-red gravelly clay loam. The subsoil is red gravelly clay loam to sandy clay. Most areas are underlain by cherty limestone residuum—yellowish-red cherty clay—at depths of 2 to 5 feet. However, there are spots where the residuum is nearly at the surface. The depth to the limestone bedrock is between 5 and 25 feet. In the few areas underlain by shale, the depth to the shale is 2 to 4 feet.

Included with this soil is about 70 acres that is on hilltops and has slopes of 5 to 12 percent.

This soil is low in fertility. It contains little organic matter. It is droughty and has poor tilth because it contains so much gravel and the surface soil is so clayey. It erodes easily if cultivated or if not protected with vegetation.

Use and suitability.—This soil is used mostly for pasture, but some has reverted to forest and some is idle. It is poorly suited to tilled crops but will produce fair to good pasture. All of the common pasture plants can be grown if the pastures are well fertilized and otherwise well managed.

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Waynesboro gravelly clay loam, severely eroded steep phase (20 to 30 percent slopes) (WkE3) (capability unit VIe–2).—This soil has a gravelly, clayey surface soil that consists primarily of subsoil material. The surface layer is strong-brown to yellowish-red gravelly clay loam about 4 or 5 inches thick. The subsoil is red gravelly clay loam to gravelly sandy clay. The depth of the parent alluvium over the cherty limestone residuum is highly variable but is generally 2 to 4 feet. The depth to the limestone bedrock is 5 to 20 feet. Shallow gullies have formed in some areas.

This soil is low in fertility and has very little organic matter. It is droughty and highly erosive.

Use and suitability.—Pasture, mainly lespedeza, is the main use for this soil. A few areas have reverted to forest.

This soil is not suited to crops. Pastures are fair if well fertilized and otherwise well managed. However, if more suitable pastureland is available, forest is probably the most profitable use.

Waynesboro clay loam, severely eroded moderately steep phase (12 to 20 percent slopes) (WmD3) (capability unit IVe–3).—This soil is on moderately short slopes. The surface soil is strong-brown to red, friable clay loam. The subsoil is red to dark-red clay loam to sandy clay. Shallow gullies have formed in some areas. The depth to the bedrock of limestone or shale is 3 to 15 feet.

The fertility is low. The supply of organic matter is very small. Tilth is rather poor. The moisture-supplying capacity is moderate to low. Roots penetrate the soil easily, but runoff is moderately rapid, and control of erosion is a major problem.

Use and suitability.—Pasture is the main use for this soil, but a small proportion is used for corn, small grains, and hay.

This is a poor soil for crops, but fair yields can be obtained if it is used in long rotations and is well fertilized. It is a good pasture soil, and all of the common pasture plants can be grown.

Wolftever Series

The Wolftever series consists of moderately well drained soils on low stream terraces along the creeks. A few areas are along the Tennessee River. These soils developed in alluvial deposits consisting mainly of limestone material. They normally occur with, but a few feet higher than, the Lindside soils. The surface soil is dark grayish-brown, friable silt loam. The subsoil is yellowish-brown, firm, compacted silty clay loam. The lower part of the subsoil is mottled and shows evidence of pan development. The relief is mostly nearly level to very gently sloping. The areas are very small.

The fertility is moderate. The reaction is medium acid. The permeability is moderate in the uppermost 18 inches, but it is moderately slow below that depth. The moisture-supplying capacity is medium.

Wolftever silt loam (1 to 3 percent slopes) (Wo) (capability unit IIe–4).—A description of a representative profile follows.

A_p 0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable.

B_2 8 to 22 inches, yellowish-brown to dark yellowish-brown (10YR 5/6 to 4/4), moderately compacted silty clay loam; moderate, medium, angular blocky structure; firm.

B_{3m} 22 to 40 inches, yellowish-brown to dark yellowish-brown (10YR 5/6 to 4/4) silty clay loam; common mottles of light brownish gray, becoming grayer with increasing depth; massive; compacted.

Use and suitability.—All of this soil is cleared and used for crops, mainly corn, small grains, lespedeza, and other hay crops. It is suited to most of the common crops. Internal drainage is too slow for alfalfa, and tobacco may be damaged during extended periods of wet weather.

Genesis, Morphology, and Classification of Soils

The purpose of this section is to present the outstanding morphological characteristics of the soils of Loudon County and to relate them to the factors of soil formation. The first part of the section deals with the environment under which the soils exist, the second, with classification of the soils and the part environment has played in determining the morphology of the soils.

Factors of Soil Formation

Soil is a function of parent material, climate, living organisms, relief, and time. The nature of the soil at any point on the earth depends upon the combination of the five major factors at that point. All five of these factors come into play in the genesis of every soil. The relative importance of each differs from place to place. In extreme cases, one factor may dominate the formation of the soil and fix most of its properties, as is common when the parent material consists of pure quartz sand. Little can happen to quartz sand, and the soils derived from it usually have faint horizons. Even in quartz sand, however, distinct profiles can be formed under certain types of vegetation if the topography is low and flat and the water table is high.

In the following pages, the five major factors of soil formation are discussed in relation to their effects on the soils of Loudon County.

Parent material

In Loudon County, parent material is the most important cause of differences among soils. Several different sources of parent material can be identified in the county —cherty and noncherty dolomitic limestone; interbedded limestone and shale; argillaceous (clayey) limestone; silty and sandy shale; calcareous sandstone; alluvium; and slope wash (local alluvium or colluvium).

The following list shows which soils developed from each kind of material.

Alluvium:
- Congaree.
- Cumberland.
- Etowah.
- Huntington.
- Lindside.
- Lobelville.
- Melvin.
- Nolichucky.
- Robertsville.
- Sequatchie.
- Taft.
- Waynesboro.
- Wolftever.

Slope wash:
- Alcoa.
- Barbourville.

Slope wash—Continued
Emory.
Greendale.
Hermitage.
Landisburg.
Leadvale.
Minvale.
Neubert.
Argillaceous limestone:
Bland.
Colbert.
Talbott.
Noncherty dolomitic limestone:
Bolton.
Decatur.
Noncherty dolomitic limestone—Continued
Dewey.
Cherty dolomitic limestone:
Clarksville.
Fullerton.
Silty shale:
Litz.
Sequoia.
Sandy shale:
Lehew.
Steekee.
Interbedded limestone and shale:
Farragut.
Calcareous sandstone:
Tellico.

From *cherty dolomitic limestone*, soils developed that are highly leached, are very strongly acid, and contain many chert fragments. Consequently, Clarksville and Fullerton soils have a lighter colored A horizon than most other soils of the county.

From *argillaceous (clayey) limestone*, soils developed that have an extremely firm or plastic B horizon that is very high in clay. Colbert and Talbott soils, therefore, are firmer and contain more clay than other soils of the county.

From *noncherty dolomitic limestone*, soils developed that have little or no chert and are not highly leached. The Decatur and Dewey soils, therefore, have a dark-colored A horizon and a thick, red or dark-red B horizon. The Bolton soils, which developed from sandy dolomitic limestone, are similar to the Decatur and Dewey soils but are more friable.

From *calcareous sandstone*, soils developed that have appreciable amounts of sand in the profile and are more friable and permeable than the other soils of the uplands.

From *silty shale*, the moderately shallow and very shallow Litz and Sequoia soils developed. Because silty shale is soft, these soils are in valleys.

From *sandy shale*, the shallow, loamy Lehew and Steekee soils developed. Because sandy shale resists geologic erosion, these soils occupy steep ridges.

From *interbedded limestone and shale*, soils developed that are between limestone soils and shale soils in properties, and more variable than either.

Soils developed from *alluvium* and *slope wash* differ, depending on the kind of material from which the parent material washed, the length of time since it was deposited, and the kind of slope on which the soils developed. On the high benches or stream terraces, the material has been in place long enough for moderate to strong horizon development. On the first bottoms and the narrow strips along drainageways, the soils are but weakly developed.

Climate

Loudon County has the humid, temperate type of climate characteristic of the southeastern United States. The general nature of the climate is given in the section, General Nature of the County, which includes a table that shows by months the distribution of precipitation and the temperature.

There is little or no variation in climate within the county, and it has been a uniform factor in soil development. Consequently, although climate has strongly affected many soils of the county, the local differences among soils cannot be attributed to differences in climate.

As is typical of soils developed in humid, temperate climates, many of the soils of the county are strongly weathered, highly leached, acid, and of low fertility. The high rainfall results in rather intense leaching and movement of soluble and colloidal materials downward in the soil. Because the soil is frozen for only short periods and to only very slight depths, weathering and translocation of materials continue almost without interruption.

Living organisms

The native vegetation, like the climate, was fairly uniform and is relatively unimportant in accounting for differences among soils of the county. However, the vegetation has had a strong influence on the common characteristics of the soils.

The first settlers found a dense stand of upland hardwoods. On the upper parts of west-facing and south-facing slopes of some of the highest hills, a few pines were intermingled with the hardwoods. On the well-drained soils, the dominant trees were oaks, hickories, poplars, and shortleaf pines. Chestnut trees were numerous but have since been killed by the blight. On the small, poorly drained areas, the trees were dominantly water-tolerant oaks, sycamores, willows, beeches, gums, and maples. The main differences in native vegetation seem to have been associated with variations in drainage.

Not much is known of the fungi and microlife, although they undoubtedly had a strong influence upon soil formation and development. The greatest activity of earthworms and other small animals is in the uppermost few inches of the soil. Mixing of soil material by rodents does not appear to have been of much importance.

The complex of living organisms in the county has been drastically changed as a result of man's activity. The clearing of the forests, the cultivation of the fields, the introduction of new species of plants, and artificial drainage of wet areas will affect the rate and direction of soil genesis in the future. Some of the results of man's effect upon soil genesis are now evident, but others may not become apparent for many centuries.

Relief

The relief in Loudon County is variable. Slopes range from nearly level to very steep. The maximum difference in elevation between the valleys and the adjacent hill crests is about 200 feet.

Relief affects soil characteristics in two principal ways: On steep slopes soils are likely to be shallow, and in level areas or depressions where the water table is high they are likely to be gray and wet. The most extensive soils in Loudon County have rolling or hilly slopes and have not been adversely affected by relief, but steep slopes are responsible for the shallowness of some of the soils derived from shale and sandstone. It is believed that slope has caused the differences between the Litz and Sequoia soils and some of the differences between the Steekee and Tellico soils. The Litz soils are on steep slopes where geologic erosion has almost kept pace with soil formation. The Sequoia soils are on smoother slopes where geologic erosion has been slower and a zonal profile has developed. The differences between the Steekee and

Tellico soils are due partly to relief and partly to differences in parent material.

Time

Differences in length of time of soil formation are responsible for most of the soil differences not attributed to parent material or relief. The soils of the county range from very young to very old. Even now, some of the areas along drainageways or on bottom lands receive fresh sediments frequently.

The best criteria for judging the age of a soil are the relative thickness and degree of development of the horizons. Using these criteria, there seems to be little difference among the upland soils underlain by limestone. These soils show strong horizon development and must be judged as "old." The shallow, steep soils derived from shale must be judged as "young," since they have only a few thin horizons and are not highly leached. The greatest differences in soil age can be seen in the soils that developed in alluvium and slope wash. These range from very young soils deposited only yesterday to old clayey soils on high stream terraces. For example, the Cumberland and the Huntington soils are thought to consist of similar parent materials, yet the Huntington soils are very young and only weakly developed, if at all; whereas the Cumberland soils have strongly expressed soil horizons.

Morphology and Composition

Soil morphology in Loudon County is expressed in strongly developed horizons in most of the soils. A few soils have weakly developed horizons. It might be said that most of the soils are in equilibrium with the soil-forming factors, or that they are mature soils. The B horizon of most of the soils has strong subangular blocky structure and is high in clay.

The differentiation of horizons in soils of the county is the result of one or more of the following processes: (1) Accumulation of organic matter; (2) leaching of carbonates and salts; (3) translocation of silicate clay minerals; and (4) reduction and transfer of iron. In most of the profiles, two or more of these processes have operated in the development of horizons.

Some organic matter has accumulated in the uppermost layer of practically all of the soils to form an A_1 horizon. Much of that organic matter is in the form of humus. However, the quantities are very small, and, over a large part of the county, the A_1 horizon has been obliterated by cultivation. Soils like the Fullerton and Clarksville soils, if they have never been cultivated, have a distinct but very thin A_1 horizon that contains little organic matter. The Cumberland, Decatur, and Tellico soils have a thicker A_1 horizon that contains more organic matter.

Leaching of carbonates and salts has occurred in all soils of the county, but it has been of limited importance in horizon differentiation. The effects have been indirect; leaching has permitted the subsequent translocation of silicate clay minerals in many of the soils. Carbonates and salts have been carried completely out of most of the soils. The great majority of the soils are strongly acid or very strongly acid. The Talbott and Colbert soils show little effect of leaching; they are darker colored in the upper part and have a higher pH than the other soils of the uplands. Leaching has also made little progress in the young soils on the bottom lands and along drainageways.

Translocation of silicate clay minerals has contributed to the development of almost all of the soils except those consisting of recent alluvium or colluvium. It is one of the more important processes in horizon differentiation in the older soils in the county. The A horizon of many of the soils shows strong eluviation, and the B horizon is high in clay. Clay films on the ped surfaces and in former root channels are evidence of much movement of silicate clays from the A horizon into the B horizon. The Fullerton, Sequoia, and Talbott soils show evidence of a high degree of translocation of silicate clays.

The reduction and transfer of iron, a process often called gleying, has occurred in the poorly drained and somewhat poorly drained soils. It has also occurred to some extent in the deeper horizons of the moderately well drained soils, for example, the Landisburg soils. In the small areas of naturally wet soils this process has been of importance in horizon differentiation. Iron has been segregated in certain horizons of some of the soils to form yellowish-red, strong-brown, or yellowish-brown mottles. It has also been segregated in concretions in the lower horizons of some soils.

In tables 8 and 9 laboratory data representing some of the more important soils in Loudon County are presented. Some of the samples analyzed were taken in Blount County, near the Loudon County border.

Table 9 contains data on pore space and moisture capacity for representative soils. Compactness of the soil is indicated by bulk density and also by total pore space. Large pores give an idea of aeration when moisture content equals field capacity. Available water holding capacity, given in the last two columns of the table, is the amount of water held between one-third atmosphere and 15 atmospheres of tension. In many soils this is approximately the amount of water that can be held in a form that plants can use.

To calculate the amount of available water that is held in the root zone, multiply the figure in the "Depth" column (depth of horizon, in inches) by the figure in the "Available water holding capacity" column. Do this for each horizon within the root zone, and add the results. For an eroded soil of the same type, start with the horizon that is now at the surface instead of with the A horizon.

A schematic diagram of the volume relationships in one soil profile is given in figure 18. It shows the distribution of solids, air, available water, and unavailable water in a profile of Sequoia silt loam after excess water has drained out. Notice that the greatest percentage of available water is in the plow layer, and that the amount of air below a depth of 29 inches is limited. Such limited aeration would be unfavorable for the growth of many roots.

TABLE 8.—*Chemical and physical characteristics of some representative soils*

Soil type and sample location	Horizon	Depth	Chemical characteristics									Physical characteristics							Textural class[2]
			Exchangeable cations[1] (milliequivalents per 100 grams)						Base saturation	pH	Organic carbon	Size class and diameter of particles in millimeters							
			Ca	Mg	K	Na	H	Sum				Very coarse sand (2.0–1.0)	Coarse sand (1.0–0.5)	Medium sand (0.5–0.25)	Fine sand (0.25–0.1)	Very fine sand (0.1–0.05)	Silt (0.05–0.002)	Clay (<0.002)	
		Inches							*Percent*		*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	
Alcoa loam:																			
Site 1	A_1	0–13	3.2	0.4	<0.1	<0.1	7.8	11.4	32	6.0	0.71	0.3	2.4	5.8	24.6	7.2	33.0	26.7	Loam.
	B_{21}	13–44	1.1	.5	<.1	<.1	8.2	9.8	16	5.0	.12	.9	2.7	4.0	20.3	6.4	23.4	42.3	Clay.
	B_{22}	44–60	1.1	.5	<.1	<.1	8.4	10.0	16	5.0	.06	.5	2.1	5.1	22.5	6.2	17.7	45.9	Clay.
Site 2	A_p	0–9	1.1	.3	<.1	<.1	5.9	7.3	19	5.6	1.11	.4	1.6	5.4	34.4	13.0	29.1	16.1	Fine sandy loam.
	B_{21}	9–15	.6	.3	<.1	<.1	7.3	8.2	11	5.2	.62	.4	1.5	5.4	30.8	10.8	30.4	20.7	Loam.
	B_{22}	15–50	.6	.2	<.1	<.1	8.2	9.0	9	5.0	.16	.2	1.1	4.7	25.2	9.7	28.8	30.3	Clay loam.
Cumberland silty clay loam:																			
Site 1	A_p	0–7	2.2	.8	.1	<.1	4.6	7.7	40	6.4	.94	1.8	4.1	6.8	15.9	5.2	38.8	27.4	Clay loam.
	B_1	7–14	1.6	.8	<.1	<.1	4.9	7.3	33	6.2	.24	1.4	3.0	4.9	12.3	4.3	35.0	39.1	Clay loam.
	B_2	14–56	0	.3	<.1	<.1	8.7	9.6	9	5.0	.06	.9	2.9	5.2	13.0	4.0	22.3	51.7	Clay.
Site 2	A_p	0–5	2.1	.6	.2	<.1	6.7	9.6	30	5.8	2.36	1.5	4.2	4.6	14.4	10.7	43.6	21.0	Loam.
	B_1	5–14	.5	.4	.2	<.1	8.0	9.1	12	5.0	.44	.9	2.8	3.2	9.7	7.6	37.4	38.4	Clay loam.
	B_2	14–56	.3	.6	.1	<.1	10.8	11.8	8	4.9	.21	1.2	2.1	2.2	6.5	4.9	24.9	58.2	Clay.
Decatur silty clay loam:																			
Site 1	A_1	0–7	1.7	.6	.3	<.1	9.8	12.3	20	5.4	1.07	1.2	3.7	4.3	7.6	6.5	46.8	29.9	Clay loam.
	B_1	7–17	1.3	.6	.1	<.1	7.7	9.7	21	5.2	.22	.8	2.7	3.0	4.9	6.0	40.6	42.0	Clay.
	B_2	17–38	.3	.6	.1	<.1	7.8	8.8	11	4.7	.09	.5	2.6	3.4	5.4	6.9	39.7	41.5	Clay.
	B_3 or C_1	38–60	.2	.4	.1	<.1	8.8	9.3	8	4.8	.04	.4	2.4	2.9	4.9	6.9	35.8	46.7	Clay.
Site 2	A_p	0–8	3.0	.6	.2	<.1	6.4	7.4	16	6.2	1.70	1.5	7.3	7.0	8.0	5.0	51.6	19.6	Silt loam.
	B_1	8–14	1.8	1.0	.2	<.1	4.6	7.6	39	6.6	.28	.8	5.4	5.3	5.1	4.2	48.2	31.0	Clay loam.
	B_{21}	14–20	1.7	.6	.1	<.1	4.3	6.7	36	6.5	.19	.6	5.2	5.4	5.0	4.2	44.6	35.0	Clay loam.
	B_{22}	20–40	.6	.6	.1	<.1	7.4	8.7	15	5.1	.12	.4	4.4	5.1	4.6	4.2	39.8	41.5	Clay.
	C or B_3	40–60	.3	.4	.1	<.1	8.1	8.9	9	5.0	.08	.5	4.2	4.1	3.8	3.6	35.5	48.3	Clay.
Emory silt loam:																			
Site 1	A	0–18	.8	.2	<.1	<.1	10.3	11.3	9	5.0	1.26	.1	.7	.8	1.9	3.1	70.7	22.7	Silt loam.
		18–50	1.3	.3	<.1	<.1	9.9	11.5	14	5.5	.69	.9	5.0	5.2	6.4	5.4	48.5	28.6	Clay loam.
Site 2	C	0–28	3.2	.7	.2	<.1	14.0	18.1	23	5.8	1.56	1.6	3.7	2.3	4.1	3.3	57.1	27.9	Silty clay loam.
		28–50	1.9	.5	<.1	<.1	9.9	12.3	20	5.2	.27	2.4	4.2	2.0	2.8	2.2	46.6	39.8	Silty clay loam.
Fullerton silt loam:																			
Site 1	A_p	0–7	1.7	.4	.1	<.1	7.0	9.2	24	5.6	1.87	5.3	6.2	4.1	4.3	3.4	53.7	23.0	Silt loam.
	B_1	7–16	.8	.3	<.1	<.1	8.2	7.1	13	5.0	.14	5.8	4.8	3.1	3.2	3.4	45.8	33.9	Clay loam.
	B_2	16–34	1.1	1.4	.2	<.1	11.8	14.3	19	4.8	.13	3.0	2.5	1.4	1.5	1.6	24.8	65.2	Clay.
	B_3	34–56	.8	1.0	.1	<.1	16.6	18.3	9	5.0	.12	1.7	1.2	.5	.7	.6	17.1	78.2	Clay.
Site 2	A	0–7	.2	0	<.1	<.1	7.9	8.1	2	4.8	1.57	3.4	5.3	4.1	6.6	6.4	58.4	15.8	Silt loam.
	A_3	7–13	.1	0	<.1	<.1	7.3	7.4	1	4.6	.43	2.4	5.2	3.7	5.8	5.9	55.4	21.6	Silt loam.
	B_1	13–19	.3	.1	<.1	<.1	8.2	8.6	5	4.6	.30	2.1	4.4	3.3	5.3	5.3	52.9	26.7	Silt loam.
	B_2	19–41	0	0	<.1	<.1	8.4	3.4	0	4.8	.11	1.8	3.6	2.8	5.1	5.1	45.6	36.0	Silty clay loam.
	B_3	41–55	.3	.2	<.1	<.1	9.4	9.9	5	4.8	.08	3.1	3.6	2.4	4.2	5.0	36.8	44.9	Clay.

See footnotes at end of table.

TABLE 8.—*Chemical and physical characteristics of some representative soils*—Continued

Soil type and sample location	Horizon	Depth	Chemical characteristics									Physical characteristics							Textural class[2]
			Exchangeable cations[1] (milliequivalents per 100 grams)						Base saturation	pH	Organic carbon	Size class and diameter of particles in millimeters							
			Ca	Mg	K	Na	H	Sum				Very coarse sand (2.0–1.0)	Coarse sand (1.0–0.5)	Medium sand (0.5–0.25)	Fine sand (0.25–0.1)	Very fine sand (0.1–0.05)	Silt (0.05–0.002)	Clay (<0.002)	
		Inches							*Percent*		*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	
Hermitage silt loam:																			
Site 1	A_p	0–7	5.8	0.2	0.1	<0.1	4.2	10.6	59	7.0	2.31	3.5	3.4	2.0	2.9	1.9	70.1	16.2	Silt loam.
	B_1	7–19	2.3	.1	.1	<.1	3.5	6.0	42	6.8	.37	2.5	2.0	.9	1.8	1.8	64.8	26.2	Silt loam.
	B_2	19–39	.6	.3	.3	<.1	7.4	8.6	14	5.0	.17	2.5	1.7	.8	1.5	1.7	62.1	29.7	Silty clay loam.
	C	39–54	.6	.1	<.1	<.1	7.8	8.5	8	5.0	.12	2.7	1.7	.9	1.6	1.9	57.5	53.7	Silty clay loam.
Site 2	A_p	0–9	1.9	.5	.1	<.1	5.6	8.3	30	6.1	1.10	1.4	3.4	13.0	26.6	5.3	29.2	21.1	Loam.
	B_1	9–16	1.3	.4	<.1	<.1	5.8	7.5	23	5.6	.37	.5	2.3	10.3	22.6	5.1	30.7	28.5	Clay loam.
	B_2	16–50	.8	.3	<.1	<.1	6.1	7.2	15	5.1	.11	.9	2.6	10.1	21.0	4.6	24.5	36.3	Clay loam.
Landisburg silt loam:																			
Site 1	A_p	0–9	.6	<.1	.1	<.1	10.0	10.7	6	5.0	1.60	3.7	5.6	4.4	5.4	4.0	62.3	14.6	Silt loam.
	B_1	9–15	.5	.1	.1	<.1	6.4	7.1	10	4.8	.27	4.9	5.2	4.3	5.4	3.6	58.7	17.9	Silt loam.
	B_2	15–22	.3	.1	<.1	<.1	5.4	5.8	7	4.8	.12	7.6	5.7	4.2	5.6	4.4	56.4	16.1	Silt loam.
	B_{2m1}	22–25	<.1	.8	<.1	<.1	3.6	4.4	18	4.7	.02	7.5	5.2	4.3	6.0	4.9	56.5	15.6	Silt loam.
	B_{2m2}	25–31	<.1	<.1	<.1	<.1	5.4	5.4	1	4.6	.06	12.4	5.2	3.9	5.2	4.3	49.2	19.8	Loam.
	B_{31}	31–47	<.1	.2	<.1	<.1	8.2	8.4	2	4.5	.02	5.9	5.3	4.0	5.4	4.2	44.3	30.9	Clay loam.
	B_{32}	47–54	<.1	.1	<.1	<.1	6.3	6.4	2	4.6	.05	7.0	6.2	4.6	6.6	5.3	45.6	24.7	Loam.
	C	54–60	<.1	.2	<.1	<.1	5.9	6.1	3	4.5	.26	7.9	6.2	4.8	5.6	3.9	39.8	31.8	Clay loam.
	Tongue	25–40	<.1	.1	<.1	<.1	5.4	5.5	2	4.7	.02	9.9	4.9	3.9	5.5	4.5	53.5	17.8	Silt loam.
Site 2	A_p	0–9	.8	.2	.1	<.1	6.3	7.4	15	5.2	1.10	1.5	3.8	7.1	12.1	7.5	55.7	12.3	Silt loam.
	B_1	9–17	.2	<.1	<.1	<.1	6.3	6.5	3	4.7	.12	2.7	4.0	7.2	14.0	6.0	49.8	16.3	Loam.
	B_{21}	17–26	.2	.3	.1	<.1	5.0	5.6	11	4.8	.06	4.7	5.9	10.7	18.5	5.7	37.0	17.5	Loam.
	B_{22}	26–33	.1	.1	<.1	<.1	5.4	5.6	4	5.0	.10	7.7	6.3	12.8	22.8	5.8	23.0	21.2	Sandy clay loam.
	B_{22m}	33–41	.1	.1	.1	<.1	5.9	6.2	5	4.8	.07	4.0	5.3	11.4	19.8	5.9	20.1	33.5	Sandy clay loam.
	B_3	41–47	<.1	<.1	<.1	<.1	5.4	5.4	1	4.8	.02	5.7	5.8	9.8	18.2	6.5	25.0	29.0	Sandy clay loam.
	C	47–60	<.1	<.1	<.1	<.1	5.9	5.9	1	4.8	.03	3.9	5.4	8.3	14.5	5.7	30.8	31.4	Clay loam.
Leadvale silt loam:																			
Site 1	A_p	0–5	2.8	.6	<.1	<.1	7.8	11.2	30	5.5	3.48	2.2	3.2	1.4	1.5	1.0	76.8	13.9	Silt loam.
	B_2	5–18	1.0	.1	<.1	<.1	8.5	9.6	11	4.6	.73	1.0	2.2	1.0	.9	.6	72.2	22.1	Silt loam.
	C_m	18–38	1.2	.9	<.1	<.1	16.6	17.7	12	4.6	.38	.8	1.0	.6	.8	.7	53.0	43.1	Silty clay.
Minvale silt loam:																			
Site 1	A_p	0–7	2.1	.9	<.1	<.1	1.8	4.8	62	7.2	.87	2.6	9.8	7.8	9.8	7.4	49.5	13.1	Loam.
	B_1	7–25	.8	.4	<.1	<.1	7.3	3.5	14	5.2	.11	1.6	7.0	5.5	6.6	5.6	42.2	31.5	Clay loam.
	B_2	25–36	.3	.1	<.1	<.1	7.4	7.8	5	5.1	.09	1.7	7.7	5.8	7.0	6.2	43.0	28.6	Clay loam.
	C	36–55	.2	.2	<.1	<.1	6.7	7.1	6	5.2	.05	2.4	8.2	6.0	6.9	6.3	45.5	24.7	Loam.
Site 2	A_p	0–5	3.2	.5	.2	<.1	6.5	10.4	38	6.0	2.72	3.0	2.2	2.6	5.4	3.5	66.9	16.4	Silt loam.
	A_3	5–10	.7	.2	.1	<.1	6.0	8.0	17	5.0	.51	1.4	1.7	2.1	4.7	3.3	66.2	20.6	Silt loam.
	B_1	10–16	.8	.2	.1	<.1	5.3	6.4	17	5.0	.29	2.2	1.8	1.7	3.8	2.9	61.7	25.9	Silt loam.
	B_2	16–34	.8	.5	<.1	<.1	6.8	7.9	14	4.8	.19	1.0	1.1	1.3	2.9	2.3	51.4	40.0	Silty clay loam.
	C	34–52	.3	.3	<.1	<.1	9.7	10.3	6	4.8	.10	.8	.8	.7	1.5	1.4	32.4	62.4	Clay.
Sequoia silt loam:																			
Site 1	A	0–6	1.2	.3	<.1	<.1	9.3	10.8	14	4.8	1.58	2.4	2.0	0.8	1.1	2.0	71.1	20.6	Silt loam.
	B_1	6–12	.8	.4	.1	<.1	14.0	15.3	8	4.6	.58	.9	1.6	.7	1.2	1.6	47.5	46.5	Silty clay.
	B_2	12–31	.5	.5	.1	<.1	15.6	16.7	6	4.8	.21	1.0	2.8	1.2	1.8	2.7	41.8	48.7	Silty clay.
	C	31–42	.2	.4	.1	<.1	15.8	16.5	4	4.8	.08	4.6	11.4	4.4	7.4	4.4	28.2	39.6	Shaly clay loam.

Site 2	A_p	0–7	2.5	.5	.1	<.1	7.9	11.0	28	5.5	1.11	4.5	4.7	1.6	1.8	2.0	60.6	25.4	Silt loam.
	B_2	7–29	.7	.6	<.1	<.1	14.9	16.2	8	4.8	.24	.3	.8	.8	2.0	2.4	42.8	50.9	Silty clay.
	C	29–45	.5	.5	<.1	<.1	16.9	17.9	6	4.7	.12	.3	.6	.6	2.8	5.4	46.1	44.2	Silty clay.
Steekee loam:																			
Site 1	A_p	1–9	0	0	0	0	0	0	0	5.0	.30	3.2	4.3	9.3	40.8	6.2	23.8	12.4	Finesandyloam.
	BC	9–18	0	0	0	0	0	0	0	5.1	.19	4.2	8.0	11.4	36.8	5.5	19.6	14.3	Finesandyloam.
Talbott silty clay loam:																			
Site 1	A_p	0–6	8.1	1.1	.4	<.1	5.9	15.5	62	6.5	1.81	2.9	3.7	1.9	3.6	2.9	63.5	21.5	Silt loam.
	A_3	6–10	5.1	1.6	.4	<.1	11.5	18.6	38	5.0	.27	.6	1.5	1.0	2.0	1.6	49.1	44.2	Silty clay.
	B_1	10–15	8.0	2.6	.5	<.1	17.8	28.9	38	4.9	.17	.2	.5	.4	.8	1.0	28.1	69.0	Clay.
	B_{21}	15–24	5.9	2.2	.6	.1	31.9	40.7	22	5.0	.13	.1	.3	.2	.5	1.0	25.3	72.6	Clay.
	B_{22}	24–37	3.3	1.6	.4	<.1	33.9	39.2	14	4.8	.13	.2	.3	.2	.5	.8	27.0	71.0	Clay.
	B_3	37–48	1.7	.8	.4	<.1	31.4	34.3	8	4.8	.13	.2	.4	.3	.7	2.0	34.5	61.9	Clay.
	C_1	48–56	1.4	.8	.3	<.1	28.5	31.0	8	4.8	.12	.5	1.6	.8	1.4	2.6	40.4	52.7	Silty clay.
	C_2	56–66	1.8	.8	.3	<.1	26.6	29.5	10	4.8	.03	.4	1.2	.6	1.3	3.4	44.6	48.5	Silty clay.
Site 2	A_p	0–6	10.3	.4	.2	<.1	4.1	15.0	73	6.6	.98	1.0	1.6	1.1	2.3	3.7	52.6	37.7	Silty clay loam.
	B_1	6–10	9.7	.9	.2	<.1	6.4	17.2	63	5.8	.49	1.5	1.4	.9	1.6	2.7	42.5	49.4	Silty clay.
	B_2	10–18	8.4	1.2	.2	<.1	6.4	16.2	60	5.5	.26	2.9	3.8	2.2	3.0	3.2	38.3	46.6	Clay.
	B_{31}	18–24	5.3	.8	.2	<.1	6.4	12.7	50	5.1	.04	.4	.7	.6	2.0	7.9	49.1	39.3	Silty clay loam.
	B_{32}	24–34	6.3	1.2	.2	<.1	6.9	14.6	53	5.1	.02	.6	.9	.7	1.9	6.9	44.8	44.2	Silty clay.
	C_1	34–49	7.6	1.1	.2	<.1	6.0	14.9	60	5.2	.01	2.5	1.7	1.2	2.4	4.7	41.9	45.6	Silty clay.
	C_2	49–60	6.6	1.0	.2	<.1	9.7	17.5	44	4.9	.02	.9	.7	.4	.8	3.5	40.9	52.8	Silty clay.
Tellico loam:																			
Site 1	A_1	0–7	1.3	1.0	.4	<.1	9.1	11.8	23	5.2	1.58	.2	.8	8.0	27.4	9.6	31.0	23.0	Loam.
	AB	7–12	.9	1.1	.4	<.1	9.2	11.6	21	5.0	.60	<.1	.6	6.5	22.1	7.4	25.2	38.2	Clay loam.
	B_{21}	12–22	.9	1.9	.4	<.1	9.6	12.8	25	5.0	.33	<.1	.6	5.9	17.4	5.8	25.4	44.9	Clay.
	B_{22}	22–37	.1	.9	.5	<.1	9.2	10.7	14	5.0	.12	.1	.6	4.5	16.8	7.1	32.4	38.5	Clay loam.
	B_3	37–54	<.1	1.0	.4	<.1	8.2	9.6	14	4.9	.05	.1	.6	4.1	17.1	8.9	33.9	35.3	Clay loam.
	C	54–74	<.1	.9	.4	<.1	9.2	10.5	12	4.9	.05	0	.3	3.5	16.9	9.2	23.7	46.4	Clay.
Site 2	A_1	0–5	4.2	1.9	.6	<.1	11.0	17.7	38	5.8	3.36	2.0	3.8	9.7	21.1	5.3	36.0	22.1	Loam.
	AB_1	5–9	.5	.6	.3	<.1	11.4	12.8	11	5.0	.92	.3	1.8	7.9	18.6	7.6	34.7	29.1	Clay loam.
	AB_2	9–16	.2	.9	.4	<.1	11.0	12.5	12	4.8	.44	1.1	1.8	6.4	16.7	5.0	30.2	38.8	Clay loam.
	B_1	16–22	.1	1.1	.3	<.1	11.5	13.0	12	4.8	.21	1.0	1.6	5.9	17.2	4.4	26.1	43.8	Clay.
	B_{21}	22–30	<.1	.7	.2	<.1	11.0	11.9	8	4.9	.13	.6	1.7	6.2	17.0	5.6	24.7	44.2	Clay.
	B_{22}	30–40	<.1	.8	.2	<.1	11.9	12.9	8	4.8	.12	.9	2.1	7.8	17.9	7.6	22.1	41.6	Clay.
	B_3	40–52	<.1	.6	.2	<.1	11.9	12.7	6	4.9	.07	.4	2.6	8.8	17.4	8.5	19.7	42.6	Clay.
	C_1	52–67	.1	.7	.2	<.1	11.9	12.9	8	4.9	.04	2.3	3.4	8.1	18.4	6.4	22.6	38.8	Clay loam.
Waynesboro loam:																			
Site 1	A_1	0–2	.9	.6	.3	<.1	15.1	16.9	11	4.4	3.92	4.3	7.8	7.0	17.0	11.6	42.2	10.1	Loam.
	A_2	2–6	<.1	.1	.2	<.1	7.7	8.0	4	4.8	1.40	2.9	6.5	6.6	14.1	13.4	44.6	11.9	Loam.
	A_3	6–10	<.1	.2	.2	<.1	5.4	5.8	7	5.0	.68	1.9	5.9	6.5	16.0	10.9	44.7	14.1	Loam.
	B_1	10–16	.1	.8	.3	<.1	6.4	7.6	16	5.0	.28	2.4	4.6	4.7	12.0	7.8	38.9	29.6	Clay loam.
	B_{21}	16–22	.1	1.6	.4	<.1	9.2	11.3	18	5.0	.21	1.6	3.8	4.1	10.0	6.8	30.4	43.3	Clay.
	B_{22}	22–27	.1	1.5	.4	<.1	9.6	11.6	17	4.9	.22	1.2	3.3	3.6	9.5	6.5	23.7	52.2	Clay.
	B_{23}	27–33	<.1	.8	.3	<.1	10.1	11.2	10	5.1	.08	1.1	3.0	3.3	8.1	7.2	15.9	61.4	Clay.
	B_3	33–47	<.1	.5	.1	<.1	9.2	9.8	6	5.0	.01	1.3	3.1	3.4	7.9	8.3	12.4	63.6	Clay.
	C_1	47–55	<.1	.3	.1	<.1	10.1	10.5	4	5.2	.01	1.8	3.6	3.8	9.8	7.1	10.5	63.4	Clay.
Site 2	A_1	0–2	1.7	.8	.2	<.1	10.0	12.7	21	5.4	2.71	12.8	11.2	6.4	11.9	7.1	38.8	11.8	Loam.
	A_2	2–7	.4	.4	.1	<.1	6.8	7.7	12	5.2	1.06	4.6	9.8	7.2	14.2	7.0	41.8	15.4	Loam.
	A_3	7–15	.1	.2	.1	<.1	7.8	8.2	5	4.7	.33	4.0	8.2	5.7	8.6	9.1	38.2	26.2	Loam.
	B_1	15–21	.1	.2	.1	<.1	8.2	8.6	5	4.7	.28	7.9	8.5	5.4	9.0	6.2	31.6	31.4	Clay loam.
	B_{21}	21–31	<.1	.4	.1	<.1	9.1	9.6	5	4.8	.13	5.9	7.1	5.2	10.5	5.3	25.9	40.1	Clay.
	B_{22}	31–42	.1	.4	.1	<.1	9.6	10.2	5	5.0	.04	3.7	6.5	5.0	9.4	5.9	17.6	51.9	Clay.
	B_3	42–53	<.1	.4	.1	<.1	9.6	10.1	5	5.0	.09	5.2	8.6	5.7	9.7	4.2	10.1	56.5	Clay.
	C_1	53–60	.1	.4	<.1	<.1	8.7	9.2	5	5.0	.24	6.9	8.9	5.9	10.6	4.4	7.1	56.2	Clay.

[1] Data obtained by Soil Survey Laboratory, Soil Conservation Service, Beltsville, Md.

[2] As determined by mechanical analysis.

TABLE 9.—*Selected physical properties of representative soils* [1]

Soil type and sample location	Horizon	Depth	Bulk density	Large pores	Small pores	Total pore space	Moisture held at tension of ⅓ atmosphere	Moisture held at tension of 15 atmospheres	Available moisture capacity	Available water holding capacity
		Inches	*Gm./cc.*	*Percent of volume*	*Percent of volume*	*Percent of volume*	*Percent*	*Percent*	*Percent*	*In./in.*
Decatur silty clay loam:										
Site 1	A_p	0–7	1.23	23.4	33.1	57.6	21.8	8.3	13.5	0.19
	B_1	7–14	1.30	21.1	35.0	56.0	22.1	9.3	12.8	.17
	B_2	14–40	1.32	22.0	31.3	53.3	22.2	10.6	11.6	.15
	B_3	40–60	1.38	19.3	33.3	52.7	24.9	12.8	12.1	.17
Site 2	A_p	0–7	1.37	19.3	36.0	55.3	21.9	11.4	10.5	.14
	B_{21}	14–20	1.40	17.4	37.0	54.5	24.0	13.7	10.3	.14
	B_{22}	20–40	1.45	13.8	39.6	53.3	24.9	14.4	10.5	.15
	B_3	40–60	1.46	11.9	41.2	53.0	26.0	18.1	7.9	.11
Site 3	A_p	0–7	1.39	14.2	34.6	48.8	23.6	11.8	11.8	.16
	B_{21}	14–22	1.45	13.3	36.6	49.9	24.6	15.2	9.4	.15
	B_2	22–40	1.39	12.6	42.7	55.3	28.8	20.1	8.7	.12
Emory silt loam:										
Site 1	------	0–6	1.40	15.8	38.0	53.8	38.4	18.9	19.5	.19
	------	6–14	1.40	13.8	25.0	38.8	36.6	19.1	17.5	.18
	------	14–40	1.20	15.6	35.3	50.9	35.4	18.3	17.1	.17
Site 2	------	0–18	1.19	19.2	36.7	55.9	27.0	9.3	17.7	.21
	------	18–40	1.09	26.5	33.6	60.1	22.7	11.8	11.0	.13
Site 3	------	0–18	1.18	21.0	39.4	60.4	29.9	15.0	14.9	.18
	------	18–20	1.27	17.2	40.7	57.9	29.0	14.1	14.9	.19
	------	28–50	1.17	15.4	44.0	59.4	31.0	13.5	17.5	.20
Fullerton silt loam:										
Site 1	A_p	0–7	1.50	16.6	29.9	46.5	23.9	4.9	19.0	.28
	A_3	7–16	1.64	15.3	31.8	47.1	20.6	6.4	14.2	.23
	B_1	16–24	1.61	15.3	32.0	47.3	23.4	11.3	12.1	.19
	B_2	24–40	1.56	13.2	35.2	48.4	26.7	14.8	11.9	.18
Site 2	A_p	0–7	1.50	25.9	31.8	57.8	20.8	8.8	12.0	.13
	A_3	7–15	1.47	17.3	33.1	50.4	20.4	10.6	9.8	.14
	B_2	20–40	1.38	16.3	37.7	53.9	27.2	18.2	9.0	.12
Site 3	A_p	0–6	1.53	19.7	25.7	45.4	22.3	4.6	17.7	.12
	A_3	6–13	1.62	17.0	27.5	44.5	18.2	10.1	8.1	.11
	B_1	13–21	1.41	21.3	32.7	54.0	21.4	12.9	8.5	.12
	B_2	21–40	1.59	10.8	34.0	44.8	23.5	14.0	9.5	----------
Greendale silt loam:										
Site 1	------	0–9	1.41	18.9	31.4	50.3	25.4	8.0	17.4	.25
	------	9–20	1.54	15.1	31.1	46.2	21.9	7.7	14.2	.22
	------	20–30	1.45	17.3	32.8	50.1	22.8	12.5	10.3	.15
	------	30–40	1.44	14.3	34.4	48.7	27.0	16.2	10.8	.16
Hermitage silt loam:										
Site 1	A_p	0–10	1.42	16.1	34.8	50.9	26.2	14.0	12.2	.18
	B_1	10–16	1.40	16.3	34.6	50.9	27.3	14.0	13.3	.19
	B_2	16–30	1.40	16.1	34.5	50.6	27.2	15.1	12.1	.17
Site 2	A_p	0–9	1.19	22.7	36.0	58.7	26.6	13.2	13.4	.16
	B_1	9–14	1.44	15.7	38.7	54.4	26.9	15.3	11.6	.17
	B_2	14–22	1.45	9.5	44.3	53.8	29.8	17.5	11.3	.18
Huntington loam:										
Site 1	------	0–7	1.54	13.1	33.3	46.4	23.7	12.6	11.1	.17
	------	7–16	1.65	11.2	31.9	43.1	22.8	10.7	12.1	.20
	------	16–30	1.74	4.6	33.0	37.6	25.7	11.4	14.3	.25
Site 2	------	0–11	1.40	13.7	36.3	50.0	27.8	15.6	12.2	.17
	------	11–16	1.55	9.1	36.5	45.6	28.1	16.9	11.2	.17
	------	16–34	1.60	9.1	35.6	44.7	27.3	16.9	10.4	.17
Site 3	------	0–12	1.34	20.0	28.1	48.1	36.9	12.3	23.5	.25
	------	12–36	1.37	20.8	28.0	48.8	36.2	12.7	23.5	.25
Lindside silt loam:										
Site 1	------	0–6	1.43	13.7	33.4	47.1	36.7	17.2	19.5	.19
	------	6–15	1.38	15.3	34.6	49.9	33.9	16.2	17.7	.18
Sequoia silt loam:										
Site 1	A_p	0–7	1.38	16.5	37.3	53.8	23.0	9.4	13.6	.18
	B_1	7–15	1.53	11.1	39.9	51.0	26.7	14.0	12.7	.19
	B_2	15–26	1.49	11.8	40.0	51.8	28.6	16.0	12.6	.18
Site 2	A_p	0–7	1.38	17.2	33.9	51.0	22.5	8.7	15.8	.19
	B_2	7–29	1.52	12.8	30.3	43.1	27.2	13.7	13.5	.21
	C_1	29–36	1.52	1.5	40.8	42.3	29.8	15.8	14.0	.22
Site 3	A_p	0–6	1.24	19.6	36.5	56.1	23.7	9.1	14.6	.18
	B_1	6–12	1.40	13.8	37.2	51.0	25.9	14.9	11.0	.15
	B_2	12–31	1.33	9.0	46.3	55.3	31.5	19.5	12.0	.16
Site 4	A_p	0–6	1.40	16.7	34.2	50.9	26.9	12.3	14.6	.20
	B_1	6–16	1.38	17.3	33.4	50.7	24.2	13.7	10.5	.14
	B_2	16–25	1.52	11.8	35.4	47.2	29.2	18.4	10.8	.16
	C_1	25–30	1.44	13.5	36.6	50.1	29.9	17.8	12.1	.17

[1] Data obtained by T. J. Longwell, Soil Survey Laboratory, Soil Conservation Service, University of Tennessee, Knoxville, Tenn.

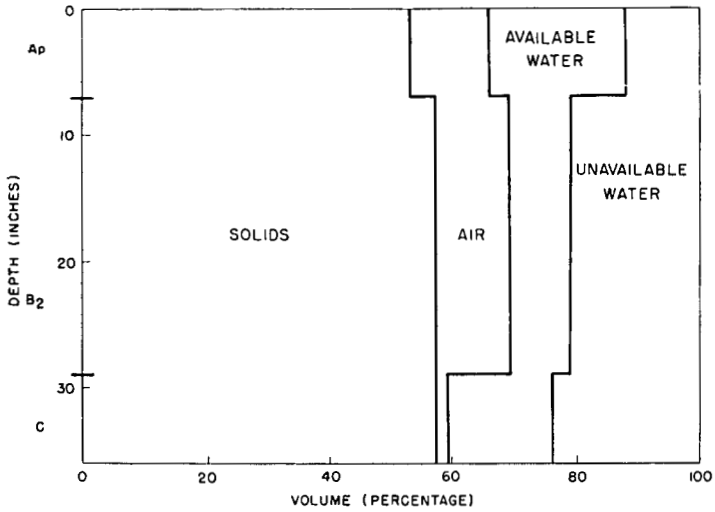

Figure 18.—**Schematic diagram of the volume relationships of a Sequoia silt loam profile at field capacity.**

Classification of Soils by Higher Categories

Soils are placed in narrow classes to permit the organization and application of knowledge about their behavior within farms or counties. They are placed in broad classes to facilitate study and comparison of large areas. In the comprehensive system of soil classification used in the United States, soils are placed in six categories, one above the other. Beginning at the top, the categories are the order, the suborder, the great soil group, the family, the series, and the type.

There are three orders and thousands of types. The suborder and family categories have never been fully developed and thus have been little used. Attention has been concentrated on the classification of soils into types and series within counties or comparable areas and to the subsequent grouping of series into great soil groups and orders.

The broadest category in the classification system is the order. There are three orders—zonal, intrazonal, and azonal (*6*). The zonal order comprises soils that have evident, genetically related horizons that reflect the dominant influence of climate and living organisms in their formation. The intrazonal order consists of soils that have evident, genetically related horizons that reflect the dominant influence of a local factor of topography, parent material, or time over the effects of climate and living organisms. The azonal order consists of soils that lack distinct, genetically related horizons, commonly because of youth, resistant parent material, or steep topography.

Table 10 shows the order and great soil group to which each series in Loudon County belongs, gives distinguishing characteristics of each series, and describes the three soil-forming factors that account for most of the differences among series.

Red-Yellow Podzolic soils.—This group consists of "well-developed, well-drained, acid soils having thin organic (A_0) and organic-mineral (A_1) horizons over a light-colored, bleached (A_2) horizon, over a red, yellowish-red, or yellow and more clayey (B) horizon. Parent materials are all more or less siliceous. Coarse, reticulate streaks or mottles of red, yellow, brown, and light gray are characteristic of deep horizons of Red-Yellow Podzolic soils where parent materials are thick" (*5*). In general, the soils of this group have a low cation-exchange capacity—8 to 10 milliequivalents per 100 grams of soil—and a base-saturation status of about 20 to 35 percent. Kaolinite is the dominant clay mineral. The subsoil has a moderate to strong subangular blocky structure and a moderate to high chroma. The Clarksville, Fullerton, Minvale, Nolichucky, Sequoia, and Talbott soils are considered representative of the central concept of the Red-Yellow Podzolic soils. The Colbert soils are moderately shallow over bedrock, have a thin B horizon, lack a highly leached A_2 horizon, and are considered as grading toward Lithosols. The Dewey, Etowah, Farragut, Hermitage, and Waynesboro soils are considered as grading toward Reddish-Brown Lateritic soils because they lack a distinct, light-colored A_2 horizon. The Landisburg, Leadvale, and Wolftever soils are not typical of Red-Yellow Podzolic soils, because they all have a weak to moderate fragipan, or a compacted mottled layer, at a depth of about 2 feet. The Landisburg and Leadvale soils are considered as grading toward Planosols. The Wolftever soils, because of the fragipan, the darker colored A horizon, and poorer drainage, are considered as grading toward both Planosols and Gray-Brown Podzolic soils.

The Red-Yellow Podzolic soils are well represented in Loudon County. The Fullerton series, which consists of typical Red-Yellow Podzolic soils, is by far the most extensive soil series in the county.

Relatively few investigations have been made of the genesis of Red-Yellow Podzolic soils as compared to most other great soil groups. Several concepts of the genesis of these soils have been advanced. One of the more recent has stemmed from theories of eluviation and illuviation developed mainly in studies of Gray-Brown Podzolic soils and Brunizems (Prairie soils). These theories place major emphasis upon the translocation of silicate minerals within the profile. Presumably a major share of the clay in the B horizon has been moved down from the A horizon.

These processes provide far less satisfactory explanations for the genesis of Red-Yellow Podzolic soils than for Gray-Brown Podzolic soils. In the Red-Yellow Podzolic soils, the A horizon is low in clay, is relatively thin, and forms a small part of the entire profile. The underlying zone of higher clay concentration, on the other hand, is very thick. The total amount of clay in the B and C horizons is much larger than can be attributed to eluviation from the A horizon. Consequently, it seems clear that other processes have been important in horizon differentiation. It is therefore suggested that the dominant processes in the genesis of Red-Yellow Podzolic soils are the formation of silicate clay minerals in the deeper horizons and the destruction of these minerals in the upper horizons (*4*).

Most of the clay minerals in the profiles seem to have been formed below what has generally been considered the solum. The clay minerals seem to have formed in the zone of rock disintegration or at comparable depths in or beneath the profile. Within that part of the profile considered the solum, the dominant process seems to be one of hydrolysis, or breakdown of silicate clay minerals.

TABLE 10.—*Classification, distinguishing characteristics of soil series, and dominant factors in soil formation*

Order, great soil group, and series	Drainage class	Color and texture of uneroded profile	Parent material	Predominant slope range	Degree of development
Zonal order					
Red-Yellow Podzolic soils:					
1. Central concept—					
Clarksville	Well drained to excessively drained.	Pale-brown cherty silt loam over yellowish-brown cherty clay loam.	Cherty dolomitic limestone.	*Percent* 20 to 50	Strong.
Fullerton	Well drained	Yellowish-brown cherty silt loam over yellowish-red cherty clay.	Cherty dolomitic limestone.	5 to 50	Strong.
Minvale	Well drained	Brown to yellowish-brown silt loam over strong-brown to yellowish-red silty clay loam.	Local alluvium and colluvium from cherty limestone.	2 to 12	Medium.
Nolichucky	Well drained	Pale-brown gravelly fine sandy loam over yellowish-red gravelly clay loam.	General mixed alluvium—chiefly from sandstone, shale, and limestone.	5 to 20	Strong.
Sequoia	Well drained	Yellowish-brown silt loam over yellowish-red, firm silty clay.	Shale and some limestone	2 to 15	Strong.
Talbott	Well drained	Yellowish-brown silt loam over yellowish-red, very firm clay.	Argillaceous limestone	5 to 20	Strong.
2. Grading toward Lithosols—					
Colbert	Well drained to moderately well drained.	Grayish-brown silty clay loam over yellowish-brown, very firm clay.	Argillaceous limestone	5 to 12	Medium.
3. Grading toward Reddish-Brown Lateritic soils—					
Dewey	Well drained	Brown to dark-brown silt loam over red, firm clay.	Noncherty dolomitic limestone.	3 to 25	Strong.
Etowah	Well drained	Dark-brown silt loam over yellowish-red, friable silty clay loam.	General alluvium—chiefly from limestone.	2 to 15	Medium.
Farragut	Well drained	Reddish-brown silt loam over red to yellowish-red, very firm silty clay.	Limestone with shale lenses.	5 to 25	Strong.
Hermitage	Well drained	Dark-brown silt loam over yellowish-red, friable silty clay loam.	Local alluvium and colluvium from limestone.	3 to 12	Medium.
Waynesboro	Well drained	Brown loam over red to dark-red clay loam to sandy clay.	General mixed alluvium—chiefly from sandstone, shale, and limestone.	3 to 30	Strong.
4. Grading toward Planosols with fragipan—					
Landisburg	Moderately well drained.	Yellowish-brown silt loam over brownish-yellow silty clay loam; fragipan at depth of about 24 inches.	Colluvium from cherty limestone.	2 to 10	Strong.
Leadvale	Moderately well drained.	Yellowish-brown silt loam over brownish-yellow silty clay loam; fragipan at depth of about 20 inches.	Local alluvium and colluvium from shale and siltstone.	2 to 5	Strong.
Wolftever	Moderately well drained.	Dark grayish-brown silt loam over yellowish-brown silty clay loam; fragipan at depth of about 20 inches.	General alluvium from limestone.	1 to 3	Medium.
Reddish-Brown Lateritic soils:					
Alcoa	Well drained	Dark reddish-brown loam over dark reddish-brown to dark-red, friable clay loam.	Colluvium from calcareous sandstone.	3 to 12	Medium.
Bolton	Well drained	Dark-brown silt loam over dark-red to yellowish-red, friable silty clay loam to clay.	Residuum from sandy dolomitic limestone.	12 to 30	Medium.
Cumberland	Well drained	Dark reddish-brown silt loam over dark-red, firm clay.	General alluvium—chiefly from limestone.	3 to 25	Strong.
Decatur	Well drained	Dark reddish-brown silt loam over dark-red, firm clay.	Residuum from dolomitic limestone.	3 to 25	Strong.
Tellico	Well drained	Dark reddish-brown loam over dark-red, friable clay loam to sandy clay.	Calcareous sandstone	20 to 50	Strong.

TABLE 10.—*Classification, distinguishing characteristics of soil series, and dominant factors in soil formation*—Con.

Order, great soil group, and series	Drainage class	Color and texture of uneroded profile	Parent material	Predominant slope range	Degree of development
Zonal order—Continued					
Gray-Brown Podzolic soils:					
Sequatchie	Well drained	Dark-brown loam over yellowish-brown or strong-brown clay loam.	General alluvium from sandstone, shale, and limestone.	1 to 5	Medium.
Intrazonal order					
Planosols with fragipan:					
Robertsville	Poorly drained	Grayish-brown or brownish-gray silt loam over light brownish-gray, plastic clay; fragipan at depth of about 8 inches.	Alluvium from limestone	0 to 2	Strong.
Taft	Somewhat poorly drained.	Grayish-brown silt loam over mottled gray and brown, plastic clay; fragipan at a depth of about 20 inches.	Alluvium from limestone	0 to 3	Strong.
Low-Humic Gley soils:					
Melvin	Poorly drained	Dark grayish-brown silt loam over light brownish-gray silt loam.	General alluvium—chiefly from limestone.	0 to 2	Weak.
Azonal order					
Lithosols:					
1. Grading toward Red-Yellow Podzolic soils—					
Bland	Well drained	Reddish-brown silty clay loam over weak-red, firm rocky silty clay.	Residuum from shaly limestone or mudstone.	5 to 20	Weak.
Lehew	Well drained to excessively drained.	Reddish-gray loam over reddish-brown shaly loam.	Residuum from interbedded shale and sandstone.	15 to 60	Weak.
Litz	Well drained	Yellowish-brown silt loam over reddish-yellow or strong-brown shaly silty clay loam.	Residuum from shale and siltstone.	10 to 30	Weak.
2. Grading toward Reddish-Brown Lateritic soils—					
Steekee	Well drained	Reddish-brown loam over reddish-brown shaly clay loam or loam.	Residuum from calcareous sandstone and sandy shale.	20 to 60	Weak.
Alluvial soils:					
1. Central concept—					
Congaree	Well drained	Very dark grayish-brown to dark-brown loam.	Alluvium from micaceous rock.	0 to 3	Weak.
Huntington	Well drained	Dark-brown, friable silt loam or loam.	General alluvium—chiefly from limestone.	0 to 3	Weak.
Lindside	Somewhat poorly drained to moderately well drained.	Dark grayish-brown or dark-brown silt loam grading to mottled gray and brown at depth of 18 inches.	General alluvium—chiefly from limestone.	0 to 2	Weak.
Lobelville	Somewhat poorly drained to moderately well drained.	Dark grayish-brown to yellowish-brown cherty silt loam grading to mottled gray and brown at depth of 16 inches.	Alluvium from cherty limestone.	0 to 2	Weak.
2. Grading toward Red-Yellow Podzolic soils—					
Barbourville	Well drained	Dark grayish-brown silt loam or loam; mottled at depth of 30 inches.	Colluvium from shale and sandstone.	1 to 4	Weak.
Emory	Well drained	Dark reddish-brown or dark-brown silt loam.	Colluvium from limestone	1 to 3	Weak.
Greendale	Well drained	Brown or yellowish-brown silt loam grading to brown and gray; mottled at depths of 25 to 30 inches.	Colluvium from cherty limestone.	1 to 3	Weak.
Neubert	Well drained	Dark reddish-brown, friable loam.	Colluvium from calcareous sandstone.	1 to 3	Weak.

The available data indicate that the maximum clay concentrations occur at considerable depths. The data in table 8 show that in the Fullerton soils the clay content increases with depths. Because of this, the clay distribution curve frequently shows a minimum at the top and a maximum at the bottom of the profile.

A profile of a modal Red-Yellow Podzolic soil, Fullerton silt loam, follows.

A_1 0 to 2 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; strongly acid; abrupt, smooth boundary.

A_2 2 to 10 inches, yellowish-brown to light yellowish-brown (10YR 5/4 to 6/4) silt loam; weak, fine and medium, granular structure; very friable; very strongly acid; clear, smooth boundary.

A_3 10 to 16 inches, yellowish-brown (10YR 5/6) silt loam; moderate, medium, granular structure; friable; very strongly acid; clear, wavy boundary.

B_1 16 to 22 inches, yellowish-red (5YR 5/8) or strong-brown (7.5YR 5/8) silty clay loam; moderate, medium and fine, subangular blocky structure; friable; very strongly acid; thin broken clay films on aggregates; few, small chert fragments; gradual, wavy boundary.

B_2 22 to 38 inches, yellowish-red (5YR 5/8) clay; strong, medium, subangular blocky structure; firm; very strongly acid; clay films on aggregate surfaces; common, fine chert fragments; gradual, wavy boundary.

B_3 38 to 50 inches, yellowish-red (5YR 5/6 to 5/8) clay; strong, medium subangular blocky structure; firm; very strongly acid; clay films on aggregate surfaces; common, small chert fragments; smooth, diffuse boundary.

C_1 50 to 65 inches, variegated red (2.5YR 4/6), yellowish-red (5YR 4/6), and brownish-yellow (10YR 6/6) cherty clay; moderate, medium, subangular blocky structure; firm; very strongly acid.

Reddish-Brown Lateritic soils.—This zonal group consists of soils that have a dark reddish-brown, granular surface soil, a B horizon of red, friable clay, and red or reticulately mottled lateritic parent material. These soils develop in a humid, tropical climate with wet-dry seasons and tropical forest vegetation (*6*).

The Reddish-Brown Lateritic soils in Loudon County do not qualify entirely, according to this definition. They did not develop in a tropical climate; their subsoil is a little less friable than typical for the group; and the clay is dominantly kaolinite rather than sequioxides and is not significantly different from that of the Red-Yellow Podzolic soils. They do, however, have a dark-brown or dark reddish-brown, granular surface soil and a thick, dark-red to dark reddish-brown B horizon that ranges from clay to clay loam in texture. They lack a distinct, leached A_2 horizon.

The Alcoa, Bolton, Cumberland, Decatur, and Tellico soils are in this great soil group.

A profile of a typical representative of the Reddish-Brown Lateritic soils in Loudon County, Decatur silt loam, follows.

A_p 1 to 7 inches, dark reddish-brown (5YR 3/3) silt loam or silty clay loam; moderate, medium, granular structure; friable; clear, smooth boundary.

A_3 7 to 11 inches, dark reddish-brown (2.5YR 3/4) silty clay loam or clay loam; moderate, fine and medium, subangular blocky structure; firm; gradual, wavy boundary.

B_1 11 to 16 inches, dark-red (2.5YR 3/6) silty clay loam to clay; moderate, medium, subangular blocky structure; firm; thin, broken clay films on ped surfaces; gradual, wavy boundary.

B_2 16 to 45 inches, dark-red (10R 3/6) clay; strong, medium, subangular blocky structure; firm to very firm; clay films on aggregate surfaces; diffuse, wavy boundary.

B_3 45 to 60 inches, dark-red (10R 3/6) to red (2.5YR 4/8) clay; moderate, medium, subangular blocky structure; firm; few, fine chert fragments.

C_1 60 to 80 inches, red (2.5YR 4/8) clay; streaked or variegated with strong brown and yellowish red; few, fine chert fragments.

Gray-Brown Podzolic soils.—This zonal group consists of soils that have a comparatively thin organic covering and organic-mineral layers over a grayish-brown leached layer that rests upon an illuvial brown horizon; they developed under deciduous forest in a temperate, moist climate (*6*).

The Sequatchie soils are the only ones in Loudon County classified as Gray-Brown Podzolic soils. They have a dark-brown, relatively thick A horizon over a strong-brown B horizon. Probably because they are young, they are only moderately leached and moderately developed.

Planosols.—This intrazonal group consists of soils having one or more horizons abruptly separated from and sharply contrasting to an adjacent horizon because of cementation, compaction, or high clay content (*5*).

The Robertsville and Taft series are the only ones in Loudon County classified as Planosols. The Robertsville soils have a highly leached, light-colored A_2 horizon over a gray or gleyed B horizon. The A_1 horizon is very thin and contains little organic matter. The B horizon is fine textured, usually a very plastic clay that is dense and has little pore space. The Taft soils are a little better drained than the poorly drained Robertsville soils and have a light-colored, leached A_2 horizon over a mottled gray and brown B horizon. The soils of both series are very strongly acid and low in bases.

Low-Humic Gley soils.—This intrazonal group consists of imperfectly drained to poorly drained soils that have very thin surface horizons, moderately high in organic matter, over mottled gray and brown, gleylike, mineral horizons with a low degree of textural differentiation (*5*).

The Melvin series is the only one in Loudon County classified in this group. The only Melvin soil mapped in the county is in nearly level to slightly depressed areas on first bottoms. It is poorly drained and is waterlogged during wet periods. The 5- to 7-inch surface soil is dark grayish-brown silt loam. The underlying material is light brownish-gray fine silt loam that ranges in texture to silty clay loam in some areas. In places the subsoil is uniformly gray; in others it is mottled with brownish yellow.

Lithosols.—This azonal group consists of soils that have no clearly expressed soil morphology and consist of a freshly and imperfectly weathered mass of rock fragments; they are largely confined to steeply sloping land (*6*).

The Lithosols in Loudon County are by no means representative of the central concept of this great soil group. They might best be termed Lithosols intergrading to Red-Yellow Podzolic soils or Reddish-Brown Lateritic soils. All have an incipient, or very thin, B horizon.

The Bland, Lehew, and Litz soils have light-colored, moderately leached surface soils and are considered as grading toward Red-Yellow Podzolic soils. The Steekee soils have a reddish-brown or dark reddish-brown surface soil and are considered as grading toward Reddish-Brown Lateritic soils.

A profile of Lehew loam follows.

- A_1 0 to 1 inch, very dark brown (10YR 2/2) or dark reddish-brown (5YR 3/2) very fine sandy loam; weak, fine, crumb structure; very friable.
- A_2 1 to 8 inches, reddish-gray to reddish-brown (5YR 5/2 to 5/3) loam; weak, fine, granular and crumb structure; very friable.
- C_1 8 to 17 inches, reddish-brown (2.5YR 4/4) very fine sandy loam; very friable; few soft fragments of sandstone and sandy shale mixed with the soil.
- C_2 17 inches +, reddish-brown (2.5YR 4/4) very fine sandy loam; very friable; mixed with leached and partially leached shale and sandstone fragments; locally, depth to bedrock is 21 inches; in places, bedrock is within a few inches of the surface; outcrops common.

Alluvial soils.—This azonal group consists of soils developed from transported and relatively recently deposited material (alluvium) characterized by weak modification (or none) of the original material by soil-forming processes.

Among the Alluvial soils in Loudon County, development of horizons ranges from none in the more recently deposited areas to weak in the older areas. The color ranges from dark grayish brown to very dark grayish brown. The Congaree, Huntington, Lindside, and Lobelville series are representative of the central concept of the Alluvial soils. The Congaree soils are the darkest in color, and the Lobelville soils are the lightest.

The Barbourville, Emory, Greendale, and Neubert series are Alluvial soils, but they also have some characteristics of the Red-Yellow Podzolic soils. As mapped in this county, the soils of these four series contain both A-C and weak A-B-C profiles. Some have a weak B horizon at a depth of less than 18 inches; in others, the B horizon is covered with more than 18 inches of overwash material.

General Nature of the County

Loudon County was established on May 27, 1870. It was formed from parts of Roane, Monroe, and Blount Counties. It was named in commemoration of Fort Loudon, which in turn was named for the Earl of Loudon, who in 1756 was commander-in-chief of the British forces in America and who was also at one time governor of Virginia (*2*). Much of the present population of this county is made up of descendants of the early settlers, who came mostly from Virginia and North Carolina. The population in 1950 was 23,182, of which 14,456 was rural and 8,726 was urban. Loudon, the county seat, had a population of 3,567, and Lenoir City had a population of 5,159. The Bureau of Business and Economic Research at the University of Tennessee estimated the total population of Loudon County in July 1957 to be 24,300.

At one time Loudon County was chiefly agricultural, but now it is an agricultural-industrial county. Although most of the population is rural, many part-time farmers depend on industry for some of their income. Most farms are small, and many produce primarily for home use.

Recreational and Cultural Facilities

Loudon County is well supplied with recreational facilities. About 6,000 acres of water provides fishing and boating. Fort Loudoun Dam is on the Tennessee River at Lenoir City in the eastern part of the county. The reservoir from Watts Bar Dam, also on the Tennessee River, backs into the county for a few miles from the western side. The Little Tennessee River enters the county at the southern boundary and empties into the Tennessee River near the center of the county. The Clinch River forms a portion of the northern boundary of the county. Great Smoky Mountains National Park is within easy driving distance.

All communities have churches and schools. Almost all parts of the county have school bus service and rural mail delivery. Telephones serve most areas, and electric power has been extended to all parts of the county. In 1954 there were estimated to be 1,327 farms in the county. Of these, 1,282 had electricity, and 612 had telephones.

Industry

There has been a substantial increase in industrial employment in Loudon County in recent years. Some of the industry is within the county, but many people are employed in industry in surrounding counties. Numerous residents of the county are employed in the atomic energy industry at nearby Oak Ridge to the north. According to the Rand McNally Commercial Atlas for 1959, there are 28 manufacturers' establishments in Loudon County. These factories employ 2,559 people. They consist of a variety of small industrial plants, located mainly in Lenoir City, Loudon, Philadelphia, and Greenback. The textile mills at Loudon and Philadelphia appear to be the largest of the factories.

Products manufactured include bricks, locks, candy, plastic casings, furniture, hosiery, metallic powder, and lumber. Barite has been mined in the southern part of the county. Crushed rock for construction purposes is produced in a few limestone quarries. At one time there were several marble quarries in the county, but most of these are no longer in operation.

Transportation and Markets

Loudon County has ample highways and railroads. Farm-to-market transportation facilities are very good. The Southern Railway passes through the center of the county, and the Louisville and Nashville Railroad crosses the extreme southeastern corner. U.S. Highways Nos. 11, 411, and 70 pass through the county, and there are also many hard-surfaced state and county roads. Gravel roads reach all parts of the county. In addition to the excellent highway and railroad facilities, the Tennessee River, which is navigable, meanders through the county.

Knoxville, in adjoining Knox County, is the principal market for the agricultural products of the county. Loudon and Lenoir City are the most important trading centers within the county.

Climate

Loudon County has a humid-temperate climate. Winter is moderate, but short, cold periods do occur. Summer is warm. During the summer months, temperatures in the daytime are usually between 75° and 90° F. Temperatures exceeding 95° are very rare. Summer nights

are cool, temperatures generally ranging between 60° and 70°. Temperatures below 5° in winter are rare. The climatic data for the county are shown in table 11.

Temperature and precipitation are uniform throughout the county. Some local variation in precipitation may occur in the summer months because of local thundershowers.

The average frost-free season is 192 days. It extends from April 14, the average date of the latest killing frost, to October 23, the average date of the earliest. The 192-day frost-free season allows a wide variety of crops to be grown. Fruit crops, particularly peaches, are frequently damaged by the early warm periods in the late winter months and the subsequent short cold spells. The latest frost recorded in spring was on May 10, and the earliest in fall was on September 26.

TABLE 11.—*Temperature and precipitation at Loudon Station, Loudon County, Tenn.*

[Elevation, 775 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1930)	Wettest year (1932)	Average snowfall
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December	40.7	77	8	4.96	3.92	9.83	1.3
January	39.9	78	−9	5.27	2.46	7.14	2.0
February	42.3	80	2	5.27	4.34	7.64	1.9
Winter	41.0	80	−9	15.50	10.72	24.61	5.2
March	49.1	87	6	5.47	5.82	5.77	.7
April	58.8	94	24	4.25	1.86	3.71	[3]
May	67.1	99	32	4.02	3.66	3.87	0
Spring	58.3	99	6	13.74	11.34	13.35	.7
June	74.7	105	42	3.80	2.04	6.70	0
July	78.8	106	49	5.08	1.52	4.17	[3]
August	77.4	104	45	3.87	1.64	4.47	0
Summer	77.0	106	42	12.75	5.20	15.34	[3]
September	72.4	102	35	2.83	3.04	2.81	0
October	60.1	93	23	2.69	2.30	5.85	0
November	47.9	85	2	3.83	4.04	5.00	.6
Fall	60.1	102	2	9.35	9.38	13.66	.6
Year	59.1	106	−9	51.34	36.64	66.96	6.5

[1] Average temperature based on a 42-year record, through 1955; highest and lowest temperatures on an 18-year record, through 1952.
[2] Average precipitation based on a 65-year record, through 1955; wettest and driest years based on a 57-year record, in the period 1889–1955; snowfall based on a 19-year record, through 1952.
[3] Trace.

Relief and Drainage

All of Loudon County lies within the valley of eastern Tennessee, which is a part of the Great Valley. In general, the land surface of the county is a great mass of rolling hills. The slope gradient ranges from nearly level to very steep; most of the area is rolling to hilly. Nearly all of the small amount of level land is on the narrow strips of bottom land along the streams. The topography is highly irregular in most places. In many places where the bedrock is limestone, there are numerous sinks or depressions and the topography is karst or semikarst. Over the remainder of the county, the drainage system has a well-defined, trellis pattern.

In most places the difference in elevation between the stream bottoms and the adjacent ridge crests is between 50 and 200 feet, but the difference is greater in places. The highest point in the county is 1,313 feet above sea level. It is in the southeastern part of the county on the crest of one of the ridges underlain by calcareous sandstone. The lowest point, which is 741 feet above sea level, is along the Clinch River where it enters Roane County (*3*).

The county is drained by the Tennessee, Little Tennessee, and Clinch Rivers. Small streams, many of which are intermittent, are abundant throughout the county. Chiefly because of the cavernous bedrock and subterranean drainage, that part of the county underlain by limestone has fewer permanent streams than areas underlain by shale or sandstone.

Geology [7]

The underlying rock strata of the county include limestone, shale, and sandstone. They range from Lower Cambrian to Middle Ordovician in age. The oldest rocks, the varicolored sandstone and shale of the Rome formation of Early Cambrian age, are exposed in the extreme southeastern part of the county just north of Eaton Crossroad. The youngest rocks, of the Bays formation of Middle Ordovician age, are exposed in a narrow belt just east of Fort Loudoun Dam. The Knox dolomite group is by far the most extensive rock formation in the county.

The various geologic formations in the county, listed according to the geologic column, are: Bays formation, Unit 2 Chickamauga limestone, Ottosee shale, Unit 1 Chickamauga limestone, Holston formation, Lenoir limestone, Newala formation, Longview dolomite, Chepultepeck dolomite, Copper Ridge dolomite, Maynardville limestone, Nolichucky shale, Maryville limestone, Rogersville shale, Rutledge limestone, and Rome formation (*3*).

The rocks have been subjected to intense earth movements. They are so closely folded and faulted that many beds are now inclined at high angles or are actually overturned. The folding and faulting can be easily observed in some exposures of bedrock (fig. 19). The ridges, hills, and valleys that are characteristic of the county are a result of differential geologic erosion of the limestone, dolomite, shale, and sandstone. The high hills and ridges are underlain by cherty dolomite, sandstone, or sandy shale. The valleys and low hilly belts are underlain by noncherty dolomite, limestone, and shale.

Agriculture

The first settlers in Loudon County found dense forest stands covering the entire area. The forest was largely

[7] Information from Tennessee Valley Authority topographic maps.

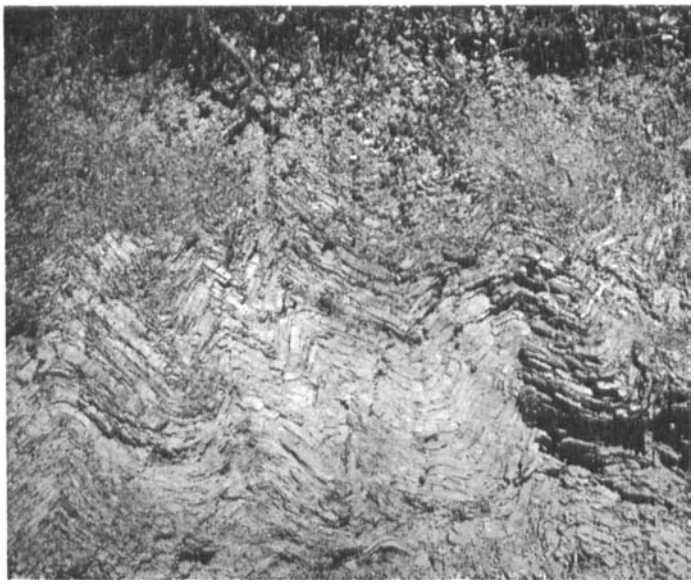

Figure 19.—**Shallow Lehew soil overlying folded and faulted, interbedded shale and sandstone.**

upland hardwoods—oak, poplar, hickory, and chestnut—and some pine. For many years, the main occupations were farming and lumbering.

In recent years there has been a steady increase in urban population and off-farm or part-time employment. According to the 1954 census, the income earned from off-farm sources by the families on 640 farms exceeded the value of farm products sold on these farms. There were 565 farmers who worked off the farm 100 or more days that year.

Number and Types of Farms

In 1954, 133,557 acres, or 87 percent of the land area of Loudon County, was in farms, and 79,977 acres of this was cropland. In the same year, 37,011 acres was in woodland, of which 12,078 acres was pastured.

The farms of the county vary greatly in size, but most of them are small. In 1954 there were only 2 farms of more than 1,000 acres, but 166 farms of less than 10 acres. The larger number of small farms is partly the result of industrial growth. The 1954 census listed the number of farms by size (in acres) as follows:

	Number of farms
Under 10	166
10 to 29	257
30 to 49	171
50 to 69	175
70 to 99	183
100 to 139	159
140 to 179	86
180 to 219	62
220 to 259	33
260 to 499	87
500 to 999	19
1,000 and over	2

The farm enterprises are diversified, and the products of many of the farms are for home use. In 1954 the census listed the number of farms by type of farm as follows:

	Number of farms
Livestock other than dairy or poultry	80
Field crop	285
Cash grain	5
Other field crops	280
Dairy	147
Poultry	10
General	75
Primarily crop	40
Primarily livestock	5
Crop and livestock	30
Miscellaneous and unclassified	803

Crops

Table 12 gives the acreage of principal crops in stated years. Corn is grown on nearly all farms. It is the most important crop grown for food and for livestock feed. Hay crops, mainly lespedeza, alfalfa, and mixed grasses and clover are grown on most farms. At one time, red clover was an important hay crop, but during the last 20 years lespedeza has been the most extensive hay crop. Although the alfalfa crop is relatively small, it is the most important hay crop on many dairy farms.

Large acreages of wheat and oats are grown but less than of corn and hay crops. The acreage of the other small grains is small. Small grains are used as feed for livestock, for winter cover, or for pasture. Some wheat is used to make flour. Burley tobacco, the most important cash crop, is grown in very small acreages on practically all farms. Fruits, berries, Irish potatoes, sweetpotatoes, and many kinds of vegetables are grown on almost all farms for home use. Vegetables are grown as a cash crop by a few farmers.

TABLE 12.—*Acreage of the principal crops in stated years*

Crop	1949	1954
	Acres	*Acres*
Corn for all purposes	12, 938	8, 550
Wheat threshed or combined	5, 075	2. 662
Oats threshed or combined	5, 348	4, 080
Hay crops, total	20, 304	15, 567
Alfalfa and alfalfa mixtures	2, 120	1, 665
Clover, timothy, and grass mixtures	1, 750	2, 524
Lespedeza	13, 850	4, 808
Small grains	997	4, 320
Other hay cut	1, 587	2, 250
Tobacco harvested	1, 135	982
Potatoes, Irish, harvested for home use or for sale	[1] 112	[2] 55
Sweetpotatoes and yams harvested for home use or for sale	[1] 116	[2] 68
Vegetables harvested for sale	405	226
Tree fruits, nuts, and grapes	[3 4] 203	[5] 105

[1] Acreage for farms with less than 15 bushels harvested not included.

[2] Acreage for farms with less than 20 bushels harvested not included.

[3] In 1950.

[4] Does not include acreage for farms reporting less than ½ acre.

[5] Does not include data for farms with less than 20 trees or grapevines.

Livestock and Livestock Products

The livestock in Loudon County consist mainly of cattle, hogs, horses, mules, and chickens. Table 13 lists

the number of livestock on farms in stated years. The trend is toward an increase in the number of cattle, particularly beef cattle, the number of which increased from 8,693 to 10,148 between 1950 and 1954. The number of dairy cows increased only slightly, from 5,928 to 5,999. In 1949 the amount of whole milk sold was 1,226,853 gallons, and the amount of butterfat sold was 37,787 pounds. In 1954 the amount of whole milk sold was 2,079,239 gallons, and the amount of butterfat sold was 11,021 pounds.

TABLE 13.—*Number of livestock on farms in stated years*

Livestock	1950	1954
	Number	*Number*
Horses and colts	1, 081	542
Mules and mule colts	1, 427	834
Cattle and calves	16, 945	17, 837
Sheep and lambs	543	489
Swine	6, 007	4, 510
Chickens, 4 months old and over	55, 343	49, 969

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Glossary

Acidity.—See Reaction.

Aggregate.—Many fine soil particles held in a single mass or cluster, such as a clod, crumb, block, or prism.

Alluvial soils.—A great soil group of the azonal order. These soils are forming in material recently deposited by water. The soil-forming processes have modified this material little or none; consequently, the soils have little profile development.

Alluvium.—Sand, mud, and other sediments deposited on land by streams.

Bedrock.—The solid rock underlying soils.

Catena, soil.—A group of soils, within a specific soil zone, that have developed from similar parent material but are unlike in characteristics because of differences in relief or drainage.

Chert.—A structureless form of silica (SiO_2), very closely related to flint, that breaks into angular fragments. Soils developed from impure limestone containing fragments of chert and having large quantities of these fragments in the soil mass are called cherty soils.

Clay.—(1) As a soil separate, mineral grains less than 0.002 millimeter in diameter. (2) As a textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Colluvium.—Mixed deposits of rock fragments and coarse soil materials near the bases of steep slopes. The deposits have accumulated as the result of soil creep, slides, and local wash. Colluvial soils develop from this material.

Consistence, soil.—The degree and kind of cohesion and adhesion or the resistance to deformation or rupture of the soil aggregates; the relative mutual attraction of the particles in the whole mass or their resistance to separation. Terms commonly used to describe consistence include the following:

Compact.—Dense and firm but without any cementation.

Firm.—Crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Friable.—Crushes easily under gentle to moderate pressure between thumb and forefinger and coheres when pressed together.

Loose.—Noncoherent.

Plastic.—Soil material forms wirelike shape when rolled between thumb and forefinger, and moderate pressure is required to deform the soil mass.

Sticky.—Adhesive rather than cohesive when wet, but usually very cohesive when dry. When wet, the soil shows a decided tendency to adhere to other material and objects.

Eluviation.—The movement of soil material from one place to another within the soil in either true solution or colloidal suspension. Soil horizons that have lost material through eluviation are referred to as *eluviated*; those that have received material, as *illuviated.*

Erosion.—The wearing away or removal of soil material by water or wind.

Fertility, soil.—The inherent quality of a soil as measured by the quantity of compounds provided for proper or balanced growth of plants.

First bottom.—The normal flood plain of a stream; may be subject to frequent or infrequent overflow.

Flood plains.—See First bottom.

Fragipan.—A dense and brittle pan or layer that owes its hardness mainly to extreme density or compactness rather than to content of clay or to cementation. Removed fragments are friable, but in place the material is so dense that roots cannot penetrate and water moves through it very slowly because of small pore size.

Genesis, soil.—The mode of origin of the soil. Refers particularly to the processes causing the development of the solum from unconsolidated parent materials.

Horizon, soil.—A layer of soil, approximately parallel to the soil surface, with distinct characteristics produced by soil-forming processes.

Horizon, A.—The upper horizon of the soil mass, from which material has been removed by percolating water; the eluviated part of the solum; the surface soil. This horizon is generally divided into two or more subhorizons, of which A_0 is not a part of the mineral soil but is the accumulation of organic debris on the surface. Other subhorizons are designated as A_1, A_2, and so on.

Horizon, B.—The horizon of deposition, to which materials have been added by percolating water; the illuviated part of the solum; the subsoil. This horizon may also be divided into several subhorizons, depending on the color, structure, consistence, or character of the material deposited. These subhorizons are designated as B_1, B_2, B_3, and so on.

Horizon, C.—The horizon of partly weathered material underlying the B horizon; the substratum; usually the parent material.

Moisture-supplying capacity.—The relative capacity of the soil to take in and hold moisture in amounts favorable to most plants. It reflects slope, rate of infiltration, moisture retentiveness, and depth of the soil. Relative moisture-supplying capacity is expressed as *very high, high, medium, low,* or *very low.* The soils have been rated on their moisture-supplying capacity for summer row crops, particularly corn.

Morphology, soil.—The physical constitution of the soil expressed in the kinds of horizons, their thickness and arrangement in the profile, and their texture, structure, consistence, color, and other chemical and biological properties.

Mottles, soil.—Contrasting color patches that vary in number and size. Descriptive terms are as follows: Contrast—*faint, distinct,* and *prominent;* abundance—*few, common,* and *many;* and size—*fine, medium,* and *coarse.* The size measurements are as follows: *Fine,* commonly less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* commonly between 5 and 15 millimeters (about 0.2 to 0.6 inch) along the greatest dimension; and *coarse,* commonly more than 15 millimeters (about 0.6 inch) along the greatest dimension.

Pan.—A layer or soil horizon that is firmly compacted or is very rich in clay. Examples include hardpans, fragipans, claypans, and traffic pans.

Parent material.—(See also Horizon, C; Profile, soil; and Substratum.) The unconsolidated material from which the soil develops.

Parent rock.—The rock from which the parent materials of soils are formed.

Permeability.—That quality of a soil that enables it to transmit water and air; measured in terms of rate of flow of water through a unit cross section of saturated soil in unit time. Rates are expressed in inches per hour, as follows:

	Inches per hour
Slow	Less than 0.2.
Moderately slow	0.2 to 0.8.
Moderate	0.8 to 2.5.
Moderately rapid	2.5 to 5.0.

Phase, soil.—That subdivision of a soil type having variations in characteristics within the type that are not sufficient to justify the establishment of a new type, yet are worthy of recognition; a mapping unit. The variations are chiefly in such external characteristics as slope, stoniness, or erosion.

Productivity.—The capability of a soil to produce a specified plant or sequence of plants under a defined system of management.

Profile, soil.—A vertical section of the soil from the surface into the parent material.

Reaction.—The degree of acidity or alkalinity of a soil mass technically expressed in pH values, or in words, as follows:

	pH
Extremely acid	Below 4.5.
Very strongly acid	4.5–5.0.
Strongly acid	5.1–5.5.
Medium acid	5.6–6.0.
Slightly acid	6.1–6.5.
Neutral	6.6–7.3.
Mildly alkaline	7.4–7.8.
Moderately alkaline	7.9–8.4.
Strongly alkaline	8.5–9.0.
Very strongly alkaline	9.1 and higher.

Relief.—The elevations or inequalities of the land surface, considered collectively.

Residual material.—Soil material that has weathered or developed in place. Material that has not been moved.

Sand.—(1) As a soil separate, particles ranging in diameter from 0.05 millimeter to 2.0 millimeters. (2) As a textural class, soil material that is 85 percent or more sand and not more than 10 percent clay.

Second bottom.—The first terrace level above the flood plain, rarely or never flooded. (See First bottom.)

Series, soil.—A group of soils closely similar in all respects except the texture of the surface soil.

Silt.—(1) As a soil separate, particles ranging in diameter from 0.002 millimeter to 0.05 millimeter. (2) As a textural class, soil material that is 80 percent or more silt and less than 12 percent clay.

Slope wash.—See Alluvium and Colluvium.

Soil.—(1) The natural medium for the growth of land plants. (2) A dynamic natural body on the surface of the earth in which plants grow; composed of mineral and organic materials and living forms.

Solum.—The upper part of the profile, above the parent material, in which processes of soil formation are active.

Structure, soil.—The arrangement of individual soil particles into aggregates with definite shape or pattern. *Crumb, granular, platy, prismatic, columnar, angular, subangular,* and *blocky* are terms used to describe soil structure.

Subsoil.—Technically, the B horizon; commonly, that part of the profile below plow depth.

Substratum.—(See also Horizon, C and Parent material.) Any layer beneath the solum, or true soil.

Surface soil.—Technically, the A horizon; that part of the soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness.

Terrace, geological.—An old alluvial plain, usually flat or undulating, bordering a stream; frequently called a second bottom as contrasted with a flood plain; seldom subject to overflow.

Texture, soil.—The relative proportions of the various size groups of individual soil grains in a mass of soil. Specifically, it refers to the proportions of sand, silt, and clay. A coarse-textured soil has a high sand content; a fine-textured soil has a large proportion of clay. (See Sand, Silt, and Clay.)

Tongue.—A narrow, vertical, wedgelike extension of one horizon into or through underlying horizons.

Topsoil.—Presumably fertile soil material, generally rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Type, soil.—A subdivision of the soil series based on the texture of the surface soil.

Upland, geologic.—Land consisting of material unworked by water in recent geologic time and ordinarily lying at a higher elevation than the alluvial plain or stream terrace.

GUIDE TO MAPPING UNITS, CAPABILITY UNITS, AND WOODLAND SUITABILITY GROUPS

Map symbol	Mapping unit	Page	Capability unit	Page	Woodland suitability group	Page
AcB	Alcoa loam, gently sloping phase	60	IIe-1	9	2	25
AcC	Alcoa loam, sloping phase	60	IIIe-1	12	2	25
Ba	Barbourville silt loam	60	I-1	9	1	25
BnC	Bland silty clay loam, sloping phase	61	IIIs-1	14	10	28
BnD	Bland silty clay loam, moderately steep phase	61	IVs-1	17	10	28
BoC2	Bolton silt loam, eroded sloping phase	61	IIIe-2	12	4	28
BoD2	Bolton silt loam, eroded moderately steep phase	62	IVe-1	15	4	28
BoE2	Bolton silt loam, eroded steep phase	62	VIe-1	17	4	28
CaC	Clarksville cherty silt loam, sloping phase	62	IIIe-3	13	5	28
CaD	Clarksville cherty silt loam, moderately steep phase	62	IVe-2	15	5	28
CaE	Clarksville cherty silt loam, steep phase	63	VIe-2	18	5	28
CaF	Clarksville cherty silt loam, very steep phase	63	VIIe-1	18	5	28
CbC	Colbert silty clay loam, sloping phase	63	IIIs-1	14	10	28
CmB2	Cumberland silty clay loam, eroded gently sloping phase	64	IIe-2	10	6	28
CmC2	Cumberland silty clay loam, eroded sloping phase	64	IIIe-2	12	6	28
CmC3	Cumberland silty clay loam, severely eroded sloping phase	65	IVe-3	16	6	28
CmD2	Cumberland silty clay loam, eroded moderately steep phase	65	IVe-1	15	6	28
CmD3	Cumberland silty clay loam, severely eroded moderately steep phase.	65	IVe-3	16	6	28
CmE2	Cumberland silty clay loam, eroded steep phase	65	VIe-1	17	6	28
CoA	Congaree loam, nearly level phase	64	I-1	9	1	25
CoC	Congaree loam, sloping phase	64	I-1	9	1	25
CrE3	Cumberland and Decatur silty clay loams, severely eroded steep phases.	66	VIe-1	17	6	28
CuC2	Cumberland gravelly clay loam, eroded sloping phase	65	IIIe-2	12	6	28
CuD2	Cumberland gravelly clay loam, eroded moderately steep phase.	66	IVe-1	15	6	28
DcB2	Decatur silty clay loam, eroded gently sloping phase	66	IIe-2	10	6	28
DcC2	Decatur silty clay loam, eroded sloping phase	67	IIIe-2	12	6	28
DcC3	Decatur silty clay loam, severely eroded sloping phase	67	IVe-3	16	6	28
DcD2	Decatur silty clay loam, eroded moderately steep phase	67	IVe-1	15	6	28
DcD3	Decatur silty clay, severely eroded moderately steep phase	67	IVe-3	16	6	28
DeB2	Dewey silty clay loam, eroded gently sloping phase	68	IIe-2	10	6	28
DeC2	Dewey silty clay loam, eroded sloping phase	68	IIIe-2	12	6	28
DeD2	Dewey silty clay loam, eroded moderately steep phase	68	IVe-1	15	6	28
DeE2	Dewey silty clay loam, eroded steep phase	69	VIe-1	17	6	28
DwC3	Dewey silty clay, severely eroded sloping phase	69	IVe-3	16	6	28
DwD3	Dewey silty clay, severely eroded moderately steep phase	69	IVe-3	16	6	28
DwE3	Dewey silty clay, severely eroded steep phase	70	VIe-1	17	6	28
Em	Emory silt loam	70	I-1	9	1	25
Er	Emory silty clay loam	70	I-1	9	1	25
EtB	Etowah silt loam, gently sloping phase	71	IIe-1	9	2	25
EtC2	Etowah silt loam, eroded sloping phase	71	IIIe-1	12	2	25
EtD2	Etowah silt loam, eroded moderately steep phase	71	IVe-1	15	2	25
FaB2	Farragut silty clay loam, eroded gently sloping phase	71	IIe-2	10	6	28
FaC2	Farragut silty clay loam, eroded sloping phase	72	IIIe-2	12	6	28
FaD2	Farragut silty clay loam, eroded moderately steep phase	72	IVe-1	15	6	28
FbC3	Farragut silty clay, severely eroded sloping phase	72	IVe-3	16	6	28
FbD3	Farragut silty clay, severely eroded moderately steep phase	72	IVe-3	16	6	28
FbE3	Farragut silty clay, severely eroded steep phase	73	VIe-1	17	6	28
FcC	Fullerton cherty silt loam, sloping phase	73	IIIe-3	13	5	28
FcD	Fullerton cherty silt loam, moderately steep phase	73	IVe-2	15	5	28
FcE	Fullerton cherty silt loam, steep phase	74	VIe-2	18	5	28
FcF	Fullerton cherty silt loam, very steep phase	74	VIIe-1	18	5	28
FdD3	Fullerton cherty silty clay loam, severely eroded moderately steep phase.	74	VIe-2	18	5	28
FdE3	Fullerton cherty silty clay loam, severely eroded steep phase	74	VIe-2	18	5	28
FdF3	Fullerton cherty silty clay loam, severely eroded very steep phase.	74	VIIe-1	18	5	28
FsB	Fullerton silt loam, gently sloping phase	75	IIe-2	10	5	28
FsC	Fullerton silt loam, sloping phase	75	IIIe-2	12	5	28
FsD	Fullerton silt loam, moderately steep phase	75	IVe-1	15	5	28
FsE	Fullerton silt loam, steep phase	76	VIe-1	17	5	28
FsF	Fullerton silt loam, very steep phase	76	VIIe-1	18	5	28
FtC3	Fullerton silty clay loam, severely eroded sloping phase	76	IVe-3	16	5	28
FtD3	Fullerton silty clay loam, severely eroded moderately steep phase.	76	IVe-3	16	5	28
FtE3	Fullerton silty clay loam, severely eroded steep phase	76	VIe-1	17	5	28
Gc	Greendale cherty silt loam	77	I-1	9	1	25

GUIDE TO MAPPING UNITS, CAPABILITY UNITS, AND WOODLAND SUITABILITY GROUPS—Con.

Map symbol	Mapping unit	Page	Capability unit	Page	Woodland suitability group	Page
Ge	Greendale silt loam	77	I–1	9	1	25
Gl	Gullied land, limestone materials	77	VIIs–1	18	10	28
Gs	Gullied land, shale materials	77	VIIs–1	18	10	28
Ha	Lindside silt loam	81	IIw–1	11	3	28
Hb	Lindside silt loam, local alluvium phase	82	IIw–1	11	3	28
HcC	Hermitage cherty silt loam, sloping phase	78	IIIe–1	12	2	25
HeB	Hermitage silt loam, gently sloping phase	78	IIe–1	9	2	25
HeC2	Hermitage silt loam, eroded sloping phase	78	IIIe–1	12	2	25
HnA	Huntington loam, nearly level phase	79	I–1	9	1	25
HnC	Huntington loam, sloping phase	79	I–1	9	1	25
LcB	Landisburg cherty silt loam, gently sloping phase	80	IIe–4	11	9	28
LdB	Landisburg silt loam, gently sloping phase	79	IIe–4	11	9	28
LdC2	Landisburg silt loam, eroded sloping phase	79	IIe–4	11	9	28
LeB	Leadvale silt loam, gently sloping phase	80	IIe–4	11	9	28
LhD	Lehew loam, moderately steep phase	80	IVs–1	17	8	28
LhE	Lehew loam, steep phase	81	VIIs–1	18	8	28
LhF	Lehew loam, very steep phase	81	VIIs–1	18	8	28
Ln	Lindside silt loam	81	IIw–1	11	3	28
Lo	Lindside silt loam, local alluvium phase	82	IIw–1	11	3	28
LsC	Litz shaly silty clay loam, sloping phase	83	IVs–1	17	8	28
LsD	Litz shaly silty clay loam, moderately steep phase	83	IVs–1	17	8	28
LsE	Litz shaly silty clay loam, steep phase	83	VIIs–1	18	8	28
LtC	Litz silt loam, sloping phase	82	IIIs–1	14	8	28
LtD	Litz silt loam, moderately steep phase	82	IVs–1	17	8	28
LtE	Litz silt loam, steep phase	83	VIIs–1	18	8	28
Lu	Lobelville cherty silt loam	83	IIw–1	11	3	28
Ma	Made land	84	VIIs–1	18	------	------
Me	Melvin silt loam	84	IIIw–1	14	9	28
MrC2	Minvale cherty silt loam, eroded sloping phase	85	IIIe–1	12	2	25
MsB	Minvale silt loam, gently sloping phase	84	IIe–1	9	2	25
MsC2	Minvale silt loam, eroded sloping phase	85	IIIe–1	12	2	25
Ne	Neubert loam	85	I–1	9	1	25
NoC	Nolichucky gravelly fine sandy loam, sloping phase	86	IIIe–3	13	5	28
NoD2	Nolichucky gravelly fine sandy loam, eroded moderately steep phase.	86	IVe–2	15	5	28
Qa	Quarry	86	VIIs–1	18	------	------
Rb	Robertsville silt loam	87	IVw–1	16	9	28
Ro	Rockland	87	VIIs–1	18	10	28
SaB	Sequatchie fine sandy loam, gently sloping phase	87	IIe–1	9	1	25
ScB	Sequatchie loam, gently sloping phase	87	IIe–1	9	1	25
ScC	Sequatchie loam, sloping phase	88	IIIe–1	12	1	25
SeC	Sequoia silt loam, sloping phase	89	IIIe–4	13	7	28
SkB2	Sequoia silty clay loam, eroded gently sloping phase	88	IIe–3	10	7	28
SkC2	Sequoia silty clay loam, eroded sloping phase	88	IIIe–4	13	7	28
SkD2	Sequoia silty clay loam, eroded moderately steep phase	89	IVe–3	16	7	28
SlC3	Sequoia silty clay, severely eroded sloping phase	89	IVe–3	16	7	28
SlD3	Sequoia silty clay, severely eroded moderately steep phase	89	IVs–1	17	7	28
StD	Steekee loam, moderately steep phase	89	IVs–1	17	8	28
StF	Steekee loam, very steep phase	90	VIIs–1	18	8	28
SvF	Steekee shaly loam, very steep phase	90	VIIs–1	18	8	28
Ta	Taft silt loam	90	IVw–1	16	9	28
TbC2	Talbott silty clay loam, eroded sloping phase	90	IIIe–4	13	7	28
TcC3	Talbott silty clay, severely eroded sloping phase	91	IVe–3	16	7	28
TcD3	Talbott silty clay, severely eroded moderately steep phase	91	IVe–3	16	7	28
Td	Talbott and Colbert very rocky soils, 5 to 25 percent slopes	91	VIIs–1	18	10	28
TgC3	Tellico clay loam, severely eroded sloping phase	93	IVe–3	16	4	28
TgD3	Tellico clay loam, severely eroded moderately steep phase	93	IVe–3	16	4	28
TgE3	Tellico clay loam, severely eroded steep phase	93	VIe–1	17	4	28
TgF3	Tellico clay loam, severely eroded very steep phase	93	VIIe–1	18	4	28
TlC2	Tellico loam, eroded sloping phase	92	IIIe–2	12	4	28
TlD2	Tellico loam, eroded moderately steep phase	92	IVe–1	15	4	28
TlE2	Tellico loam, eroded steep phase	92	VIe–1	17	4	28
TlF	Tellico loam, very steep phase	92	VIIe–1	18	4	28
WgC2	Waynesboro gravelly loam, eroded sloping phase	94	IIIe–3	13	4	28
WgD2	Waynesboro gravelly loam, eroded moderately steep phase	95	IVe–2	15	4	28
WgE2	Waynesboro gravelly loam, eroded steep phase	95	VIe–2	18	4	28
WkD3	Waynesboro gravelly clay loam, severely eroded moderately steep phase.	95	VIe–2	18	4	28
WkE3	Waynesboro gravelly clay loam, severely eroded steep phase	96	VIe–2	18	4	28
WlB2	Waynesboro loam, eroded gently sloping phase	94	IIe–2	10	4	28
WlC	Waynesboro loam, sloping phase	94	IIIe–2	12	4	28
WlC2	Waynesboro loam, eroded sloping phase	94	IIIe–2	12	4	28
WlD2	Waynesboro loam, eroded moderately steep phase	94	IVe–1	15	4	28
WlE2	Waynesboro loam, eroded steep phase	94	VIe–1	17	4	28
WmD3	Waynesboro clay loam, severely eroded moderately steep phase.	96	IVe–3	16	4	28
Wo	Wolftever silt loam	96	IIe–4	11	9	28

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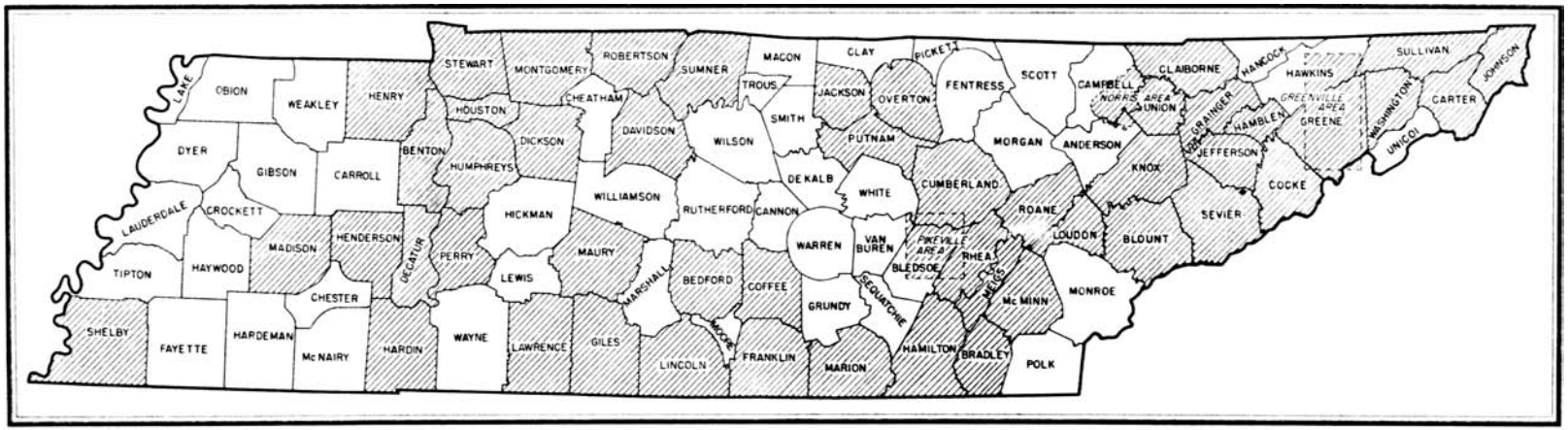

Areas surveyed in Tennessee shown by shading.

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GENERAL SOIL MAP
LOUDON COUNTY, TENNESSEE

LEGEND

1 — Light-colored, cherty soils on hilly and steep uplands: Fullerton-Clarksville-Bolton

2 — Mixed light-colored, cherty soils and red soils on rolling and hilly uplands: Fullerton-Greendale-Dewey

3 — Mainly rolling to hilly soils over acid shales: Sequoia-Litz-Lindside

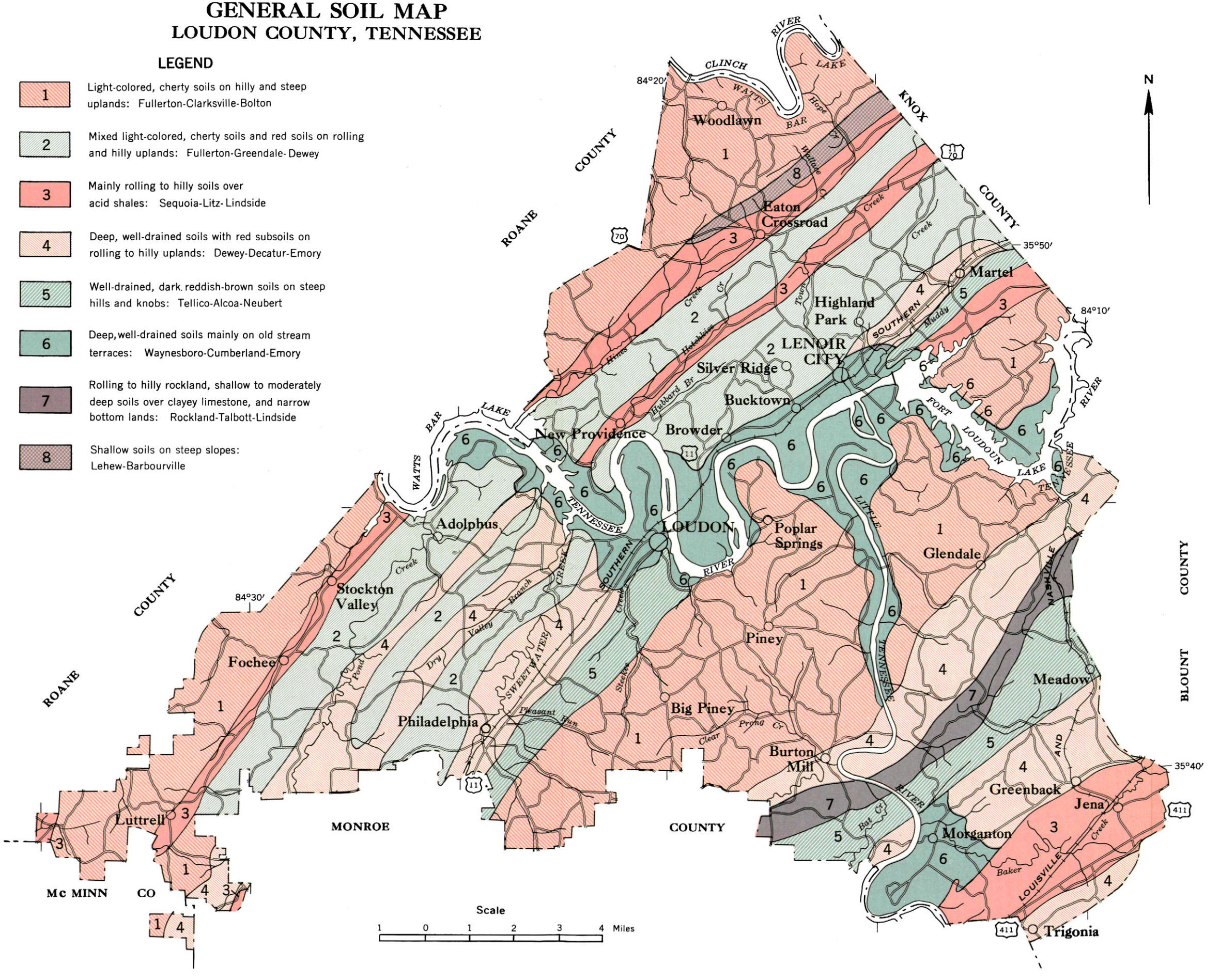
4 — Deep, well-drained soils with red subsoils on rolling to hilly uplands: Dewey-Decatur-Emory

5 — Well-drained, dark reddish-brown soils on steep hills and knobs: Tellico-Alcoa-Neubert

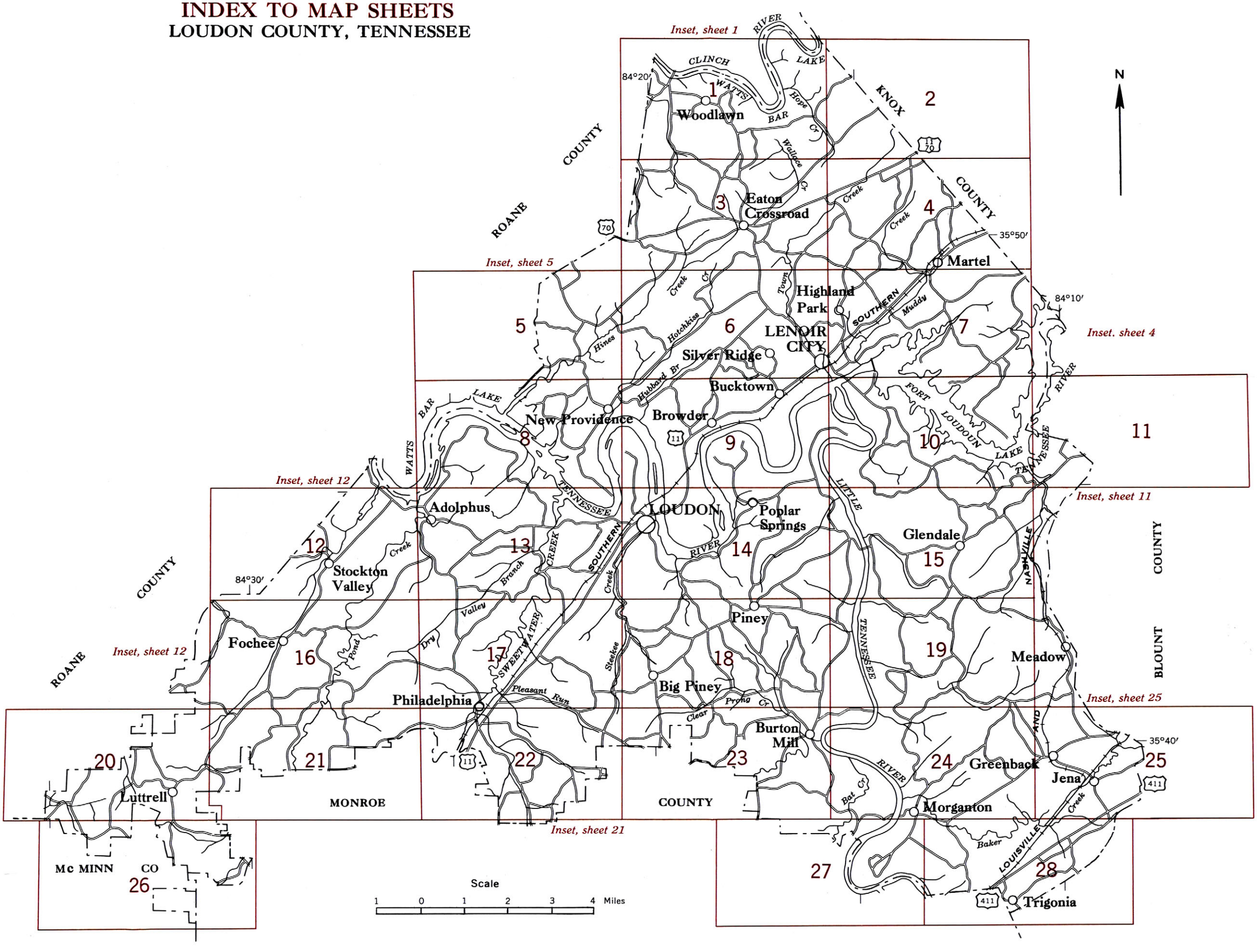
6 — Deep, well-drained soils mainly on old stream terraces: Waynesboro-Cumberland-Emory

7 — Rolling to hilly rockland, shallow to moderately deep soils over clayey limestone, and narrow bottom lands: Rockland-Talbott-Lindside

8 — Shallow soils on steep slopes: Lehew-Barbourville



INDEX TO MAP SHEETS
LOUDON COUNTY, TENNESSEE



SOIL LEGEND

Each soil symbol consists of letters or a combination of letters and a number. The first capital letter is the initial of the soil series name. The second capital letter, A, B, C, D, E, or F, shows dominant range of slope. The number shows degree of erosion if the soil is named as eroded. The slope letter is omitted if all soils of that series in the county are nearly level or gently sloping, as Ba or Me. The slope letter is also omitted from symbols for several land types that occur on a wide range of slope: Gl, Gs, Ro, and Td.

SYMBOL	NAME
AcB	Alcoa loam, gently sloping phase
AcC	Alcoa loam, sloping phase
Ba	Barbourville silt loam
BnC	Bland silty clay loam, sloping phase
BnD	Bland silty clay loam, moderately steep phase
BoC2	Bolton silt loam, eroded sloping phase
BoD2	Bolton silt loam, eroded moderately steep phase
BoE2	Bolton silt loam, eroded steep phase
CaC	Clarksville cherty silt loam, sloping phase
CaD	Clarksville cherty silt loam, moderately steep phase
CaE	Clarksville cherty silt loam, steep phase
CaF	Clarksville cherty silt loam, very steep phase
CbC	Colbert silty clay loam, sloping phase
CmB2	Cumberland silty clay loam, eroded gently sloping phase
CmC2	Cumberland silty clay loam, eroded sloping phase
CmC3	Cumberland silty clay loam, severely eroded sloping phase
CmD2	Cumberland silty clay loam, eroded moderately steep phase
CmD3	Cumberland silty clay loam, severely eroded moderately steep phase
CmE2	Cumberland silty clay loam, eroded steep phase
CoA	Congaree loam, nearly level phase
CoC	Congaree loam, sloping phase
CrE3	Cumberland and Decatur silty clay loams, severely eroded steep phases
CuC2	Cumberland gravelly clay loam, eroded sloping phase
CuD2	Cumberland gravelly clay loam, eroded moderately steep phase
DcB2	Decatur silty clay loam, eroded gently sloping phase
DcC2	Decatur silty clay loam, eroded sloping phase
DcC3	Decatur silty clay loam, severely eroded sloping phase
DcD2	Decatur silty clay loam, eroded moderately steep phase
DcD3	Decatur silty clay, severely eroded moderately steep phase
DeB2	Dewey silty clay loam, eroded gently sloping phase
DeC2	Dewey silty clay loam, eroded sloping phase
DeD2	Dewey silty clay loam, eroded moderately steep phase
DeE2	Dewey silty clay loam, eroded steep phase
DwC3	Dewey silty clay, severely eroded sloping phase
DwD3	Dewey silty clay, severely eroded moderately steep phase
DwE3	Dewey silty clay, severely eroded steep phase
Em	Emory silt loam
Er	Emory silty clay loam
EtB	Etowah silt loam, gently sloping phase
EtC2	Etowah silt loam, eroded sloping phase
EtD2	Etowah silt loam, eroded moderately steep phase
FaB2	Farragut silty clay loam, eroded gently sloping phase
FaC2	Farragut silty clay loam, eroded sloping phase
FaD2	Farragut silty clay loam, eroded moderately steep phase
FbC3	Farragut silty clay, severely eroded sloping phase
FbD3	Farragut silty clay, severely eroded moderately steep phase
FbE3	Farragut silty clay, severely eroded steep phase
FcC	Fullerton cherty silt loam, sloping phase
FcD	Fullerton cherty silt loam, moderately steep phase
FcE	Fullerton cherty silt loam, steep phase
FcF	Fullerton cherty silt loam, very steep phase
FdD3	Fullerton cherty silty clay loam, severely eroded moderately steep phase
FdE3	Fullerton cherty silty clay loam, severely eroded steep phase
FdF3	Fullerton cherty silty clay loam, severely eroded very steep phase
FsB	Fullerton silt loam, gently sloping phase
FsC	Fullerton silt loam, sloping phase
FsD	Fullerton silt loam, moderately steep phase
FsE	Fullerton silt loam, steep phase
FsF	Fullerton silt loam, very steep phase
FtC3	Fullerton silty clay loam, severely eroded sloping phase
FtD3	Fullerton silty clay loam, severely eroded moderately steep phase
FtE3	Fullerton silty clay loam, severely eroded steep phase
Gc	Greendale cherty silt loam
Ge	Greendale silt loam
Gl	Gullied land, limestone materials
Gs	Gullied land, shale materials
Ha, Ln	Lindside silt loam
Hb, Lo	Lindside silt loam, local alluvium phase
HcC	Hermitage cherty silt loam, sloping phase
HeB	Hermitage silt loam, gently sloping phase
HeC2	Hermitage silt loam, eroded sloping phase
HnA	Huntington loam, nearly level phase
HnC	Huntington loam, sloping phase
LcB	Landisburg cherty silt loam, gently sloping phase
LdB	Landisburg silt loam, gently sloping phase
LdC2	Landisburg silt loam, eroded sloping phase
LeB	Leadvale silt loam, gently sloping phase
LhD	Lehew loam, moderately steep phase
LhE	Lehew loam, steep phase
LhF	Lehew loam, very steep phase
Ln, Ha	Lindside silt loam
Lo, Hb	Lindside silt loam, local alluvium phase
LsC	Litz shaly silty clay loam, sloping phase
LsD	Litz shaly silty clay loam, moderately steep phase
LsE	Litz shaly silty clay loam, steep phase
LtC	Litz silt loam, sloping phase
LtD	Litz silt loam, moderately steep phase
LtE	Litz silt loam, steep phase
Lu	Lobelville cherty silt loam
Ma	Made land
Me	Melvin silt loam
MrC2	Minvale cherty silt loam, eroded sloping phase
MsB	Minvale silt loam, gently sloping phase
MsC2	Minvale silt loam, eroded sloping phase
Ne	Neubert loam
NoC	Nolichucky gravelly fine sandy loam, sloping phase
NoD2	Nolichucky gravelly fine sandy loam, eroded moderately steep phase
Qa	Quarry
Rb	Robertsville silt loam
Ro	Rockland
SaB	Sequatchie fine sandy loam, gently sloping phase
ScB	Sequatchie loam, gently sloping phase
ScC	Sequatchie loam, sloping phase
SeC	Sequoia silt loam, sloping phase
SkB2	Sequoia silty clay loam, eroded gently sloping phase
SkC2	Sequoia silty clay loam, eroded sloping phase
SkD2	Sequoia silty clay loam, eroded moderately steep phase
SlC3	Sequoia silty clay, severely eroded sloping phase
SlD3	Sequoia silty clay, severely eroded moderately steep phase
StD	Steekee loam, moderately steep phase
StF	Steekee loam, very steep phase
SvF	Steekee shaly loam, very steep phase
Ta	Taft silt loam
TbC2	Talbott silty clay loam, eroded sloping phase
TcC3	Talbott silty clay, severely eroded sloping phase
TcD3	Talbott silty clay, severely eroded moderately steep phase
Td	Talbott and Colbert very rocky soils, 5-25 percent slopes
TgC3	Tellico clay loam, severely eroded sloping phase
TgD3	Tellico clay loam, severely eroded moderately steep phase
TgE3	Tellico clay loam, severely eroded steep phase
TgF3	Tellico clay loam, severely eroded very steep phase
TlC2	Tellico loam, eroded sloping phase
TlD2	Tellico loam, eroded moderately steep phase
TlE2	Tellico loam, eroded steep phase
TlF	Tellico loam, very steep phase
WgC2	Waynesboro gravelly loam, eroded sloping phase
WgD2	Waynesboro gravelly loam, eroded moderately steep phase
WgE2	Waynesboro gravelly loam, eroded steep phase
WkD3	Waynesboro gravelly clay loam, severely eroded moderately steep phase
WkE3	Waynesboro gravelly clay loam, severely eroded steep phase
WlB2	Waynesboro loam, eroded gently sloping phase
WlC	Waynesboro loam, sloping phase
WlC2	Waynesboro loam, eroded sloping phase
WlD2	Waynesboro loam, eroded moderately steep phase
WlE2	Waynesboro loam, eroded steep phase
WmD3	Waynesboro clay loam, severely eroded moderately steep phase
Wo	Wolftever silt loam

Soil map constructed 1960 by Cartographic Division, Soil Conservation Service, USDA, from 1953 aerial photographs. Controlled mosaic based on Tennessee plane coordinate system, east zone Lambert conformal conic projection, 1927 North American datum.

LOUDON COUNTY, TENNESSEE - SHEET NUMBER 1

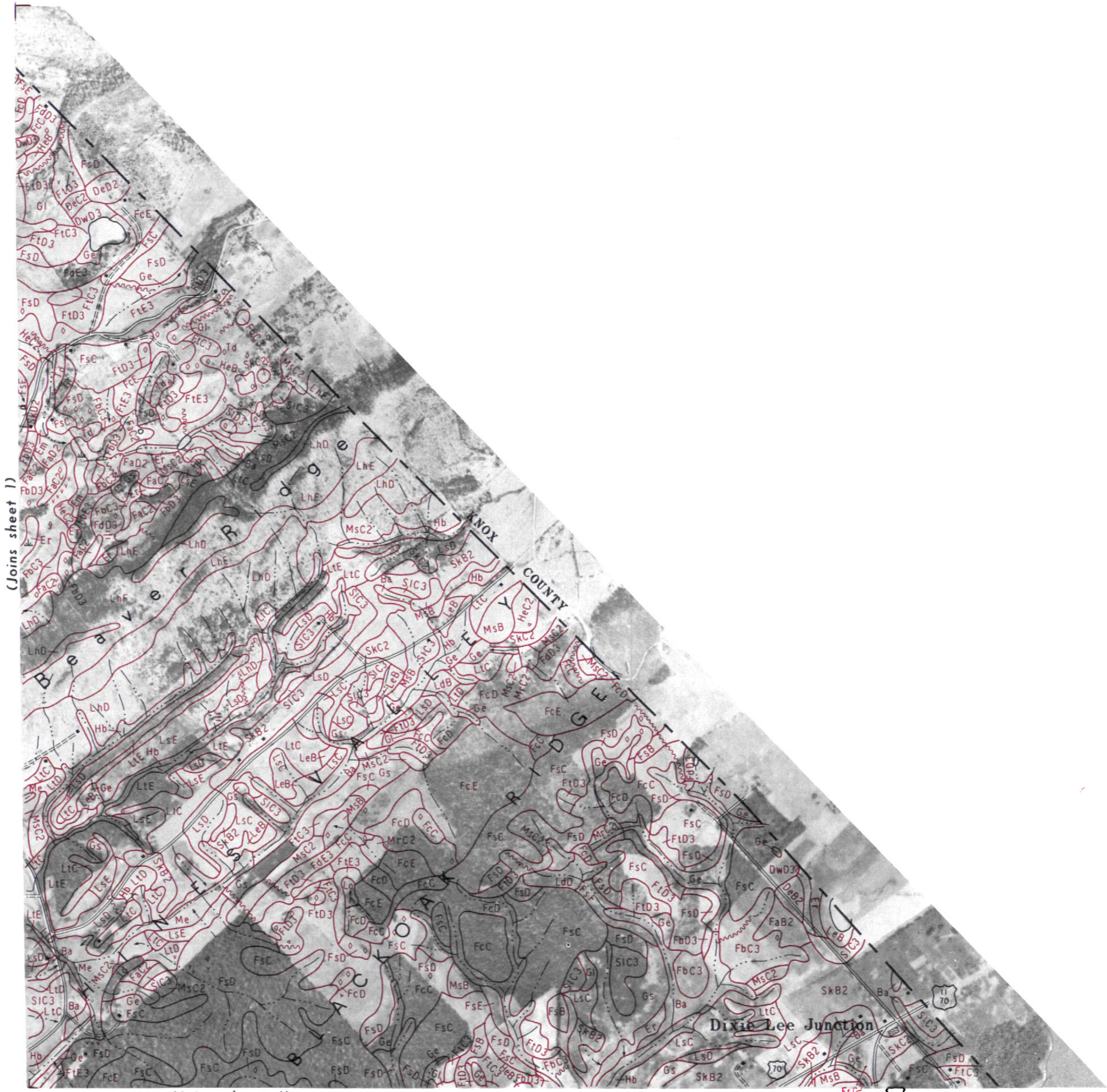
This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1953.

2

LOUDON COUNTY, TENNESSEE - SHEET NUMBER 2

N

(Joins sheet 1)



(Joins sheet 4)

0 ½ 1 Mile

Scale 1:15 840

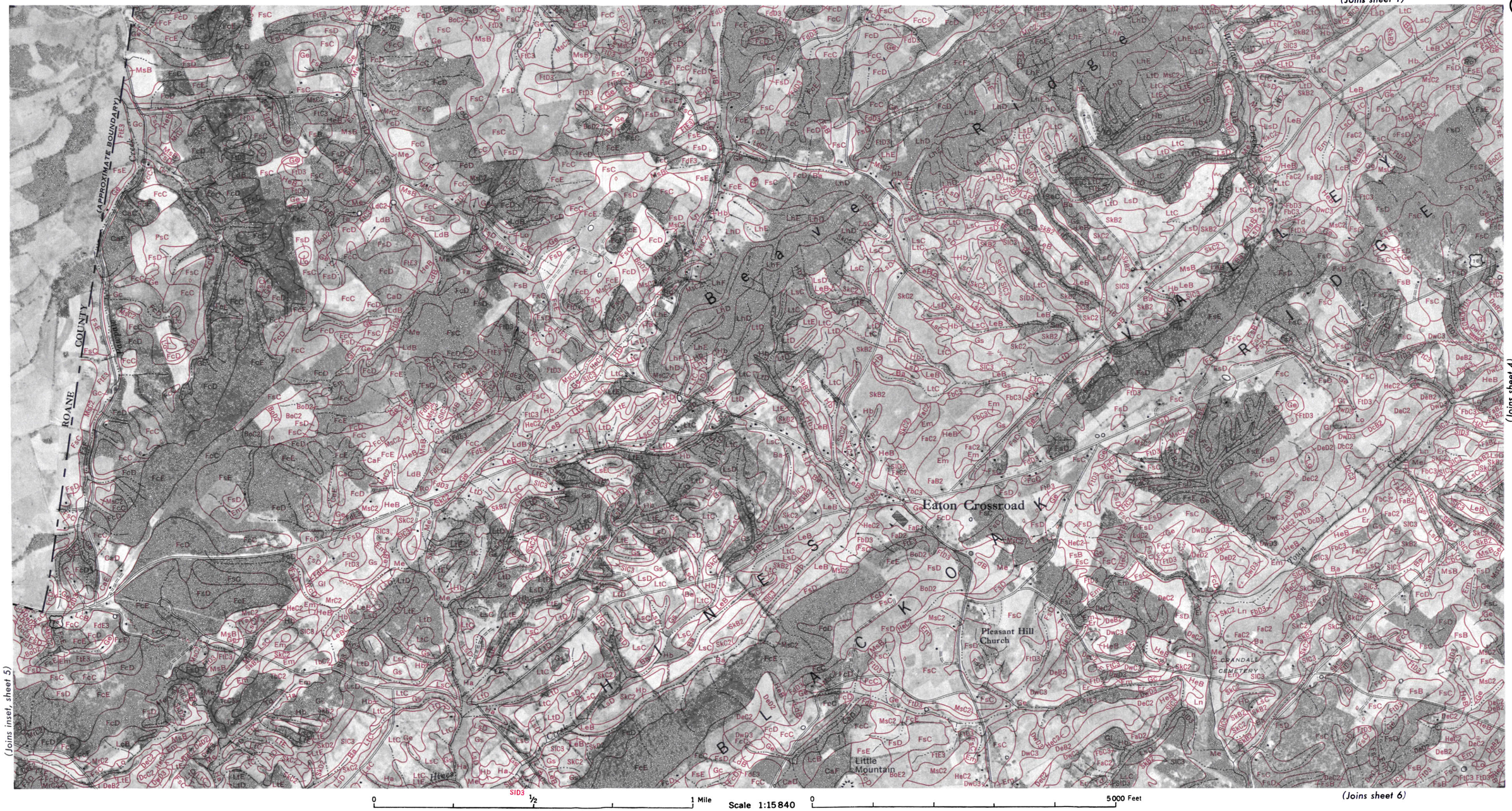
0 5000 Feet

LOUDON COUNTY, TENNESSEE - SHEET NUMBER 3

(Joins sheet 1)

3

N



(Joins inset, sheet 5)

(Joins sheet 4)

(Joins sheet 6)

0 1/2 1 Mile

Scale 1:15840

0 5000 Feet

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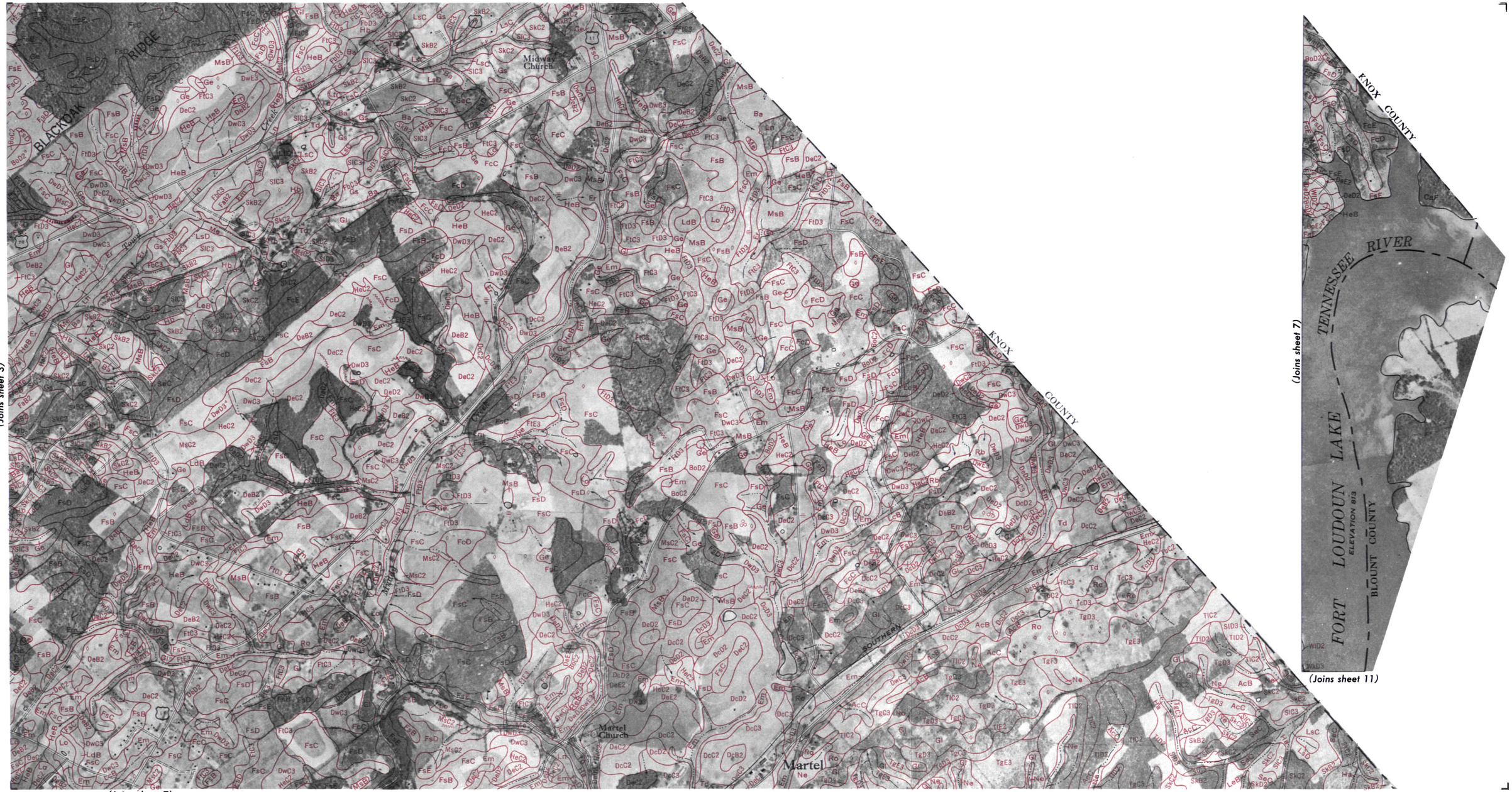
LOUDON COUNTY, TENNESSEE - SHEET NUMBER 4

(4)

(Joins sheet 2)

N

(Joins sheet 3)



(Joins sheet 7)

(Joins sheet 7)

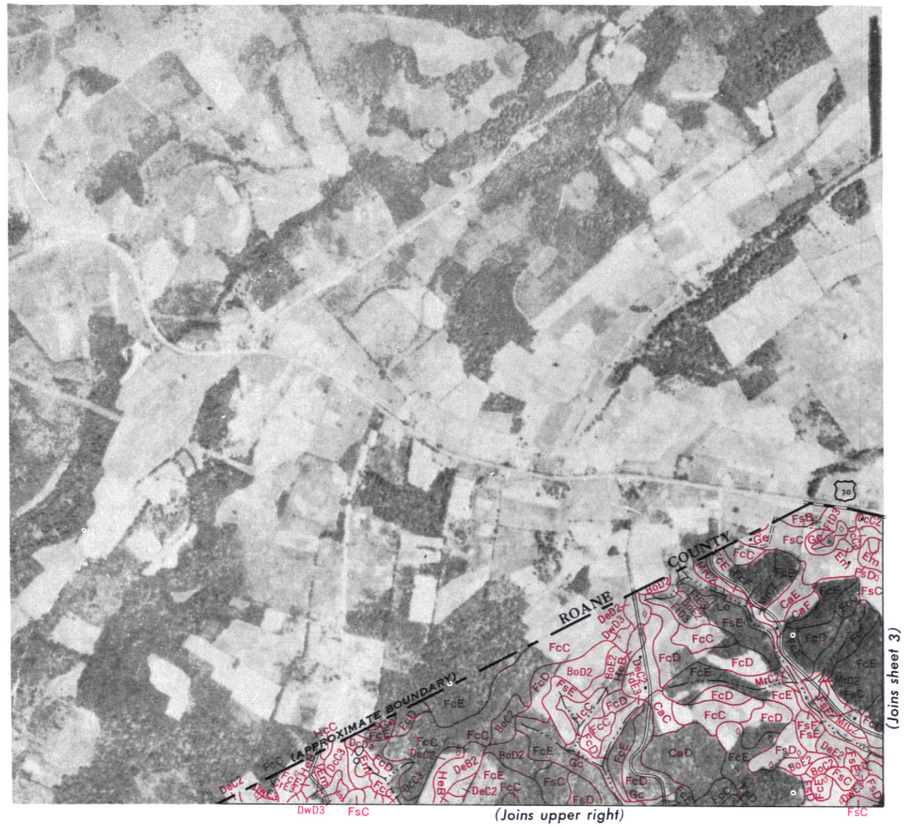
(Joins sheet 11)

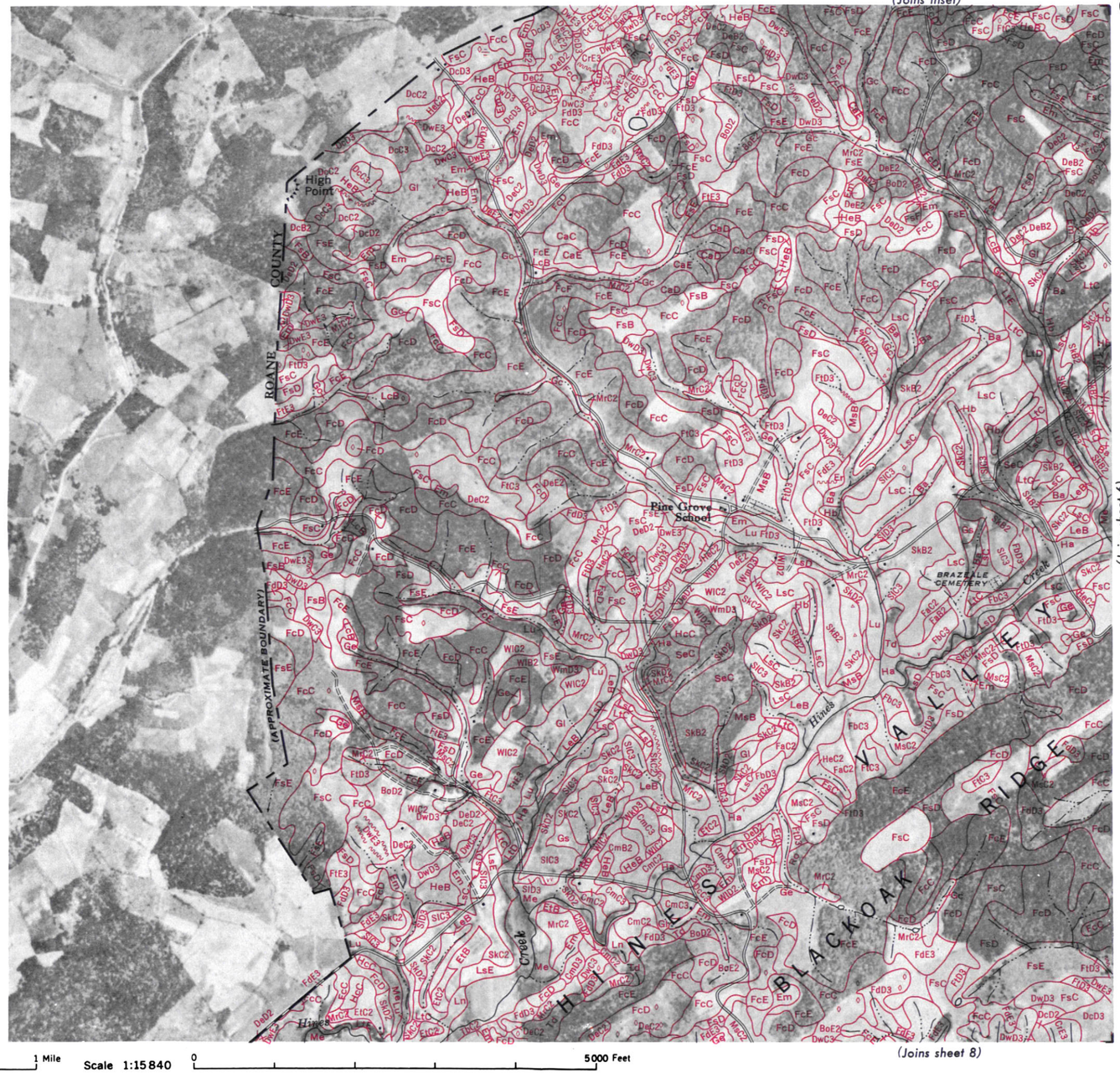
0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

LOUDON COUNTY, TENNESSEE - SHEET NUMBER 5





0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

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LOUDON COUNTY, TENNESSEE - SHEET NUMBER 6

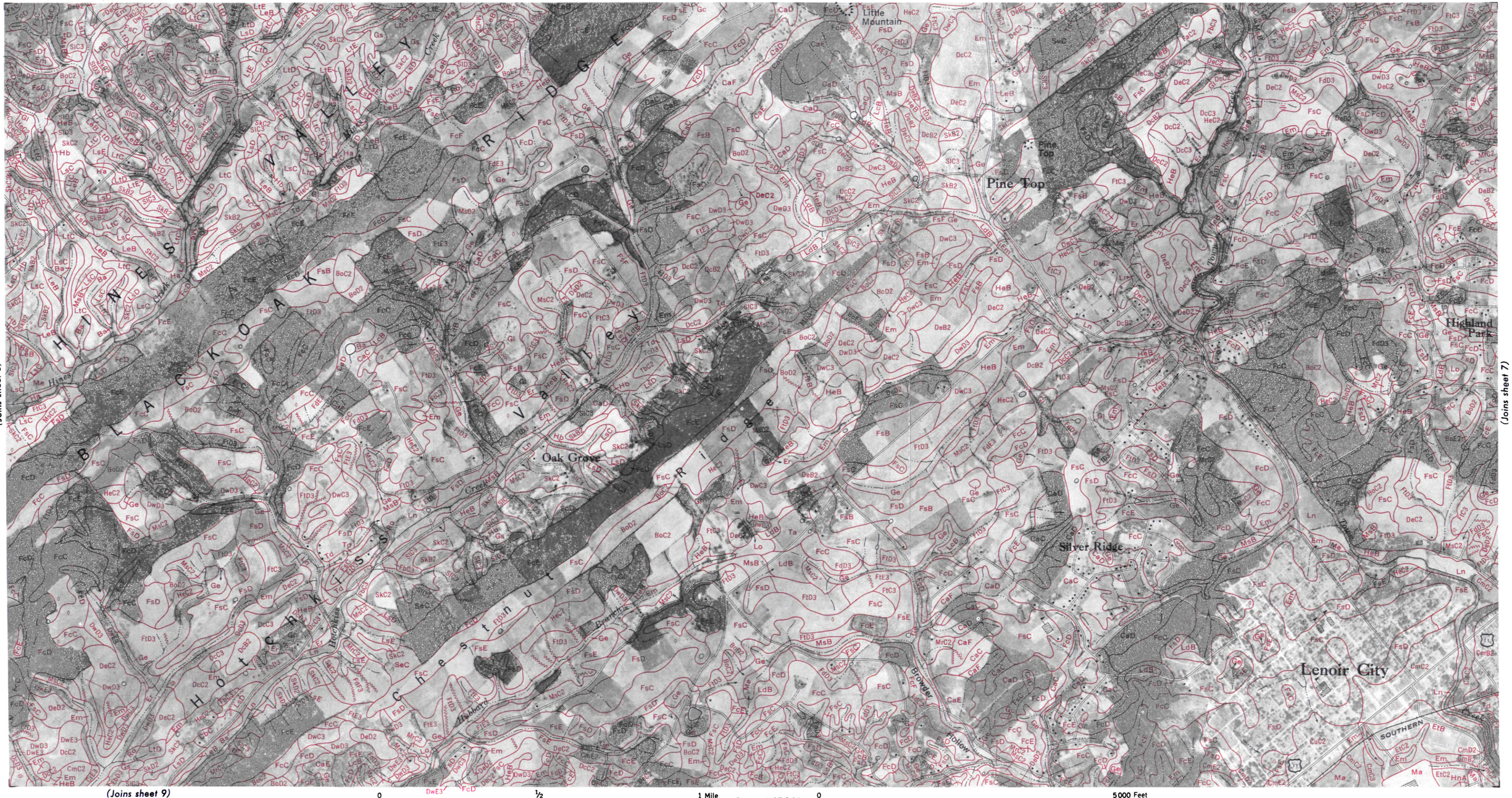
(6)

(Joins sheet 3)

N

(Joins sheet 5)

(Joins sheet 7)



(Joins sheet 9)

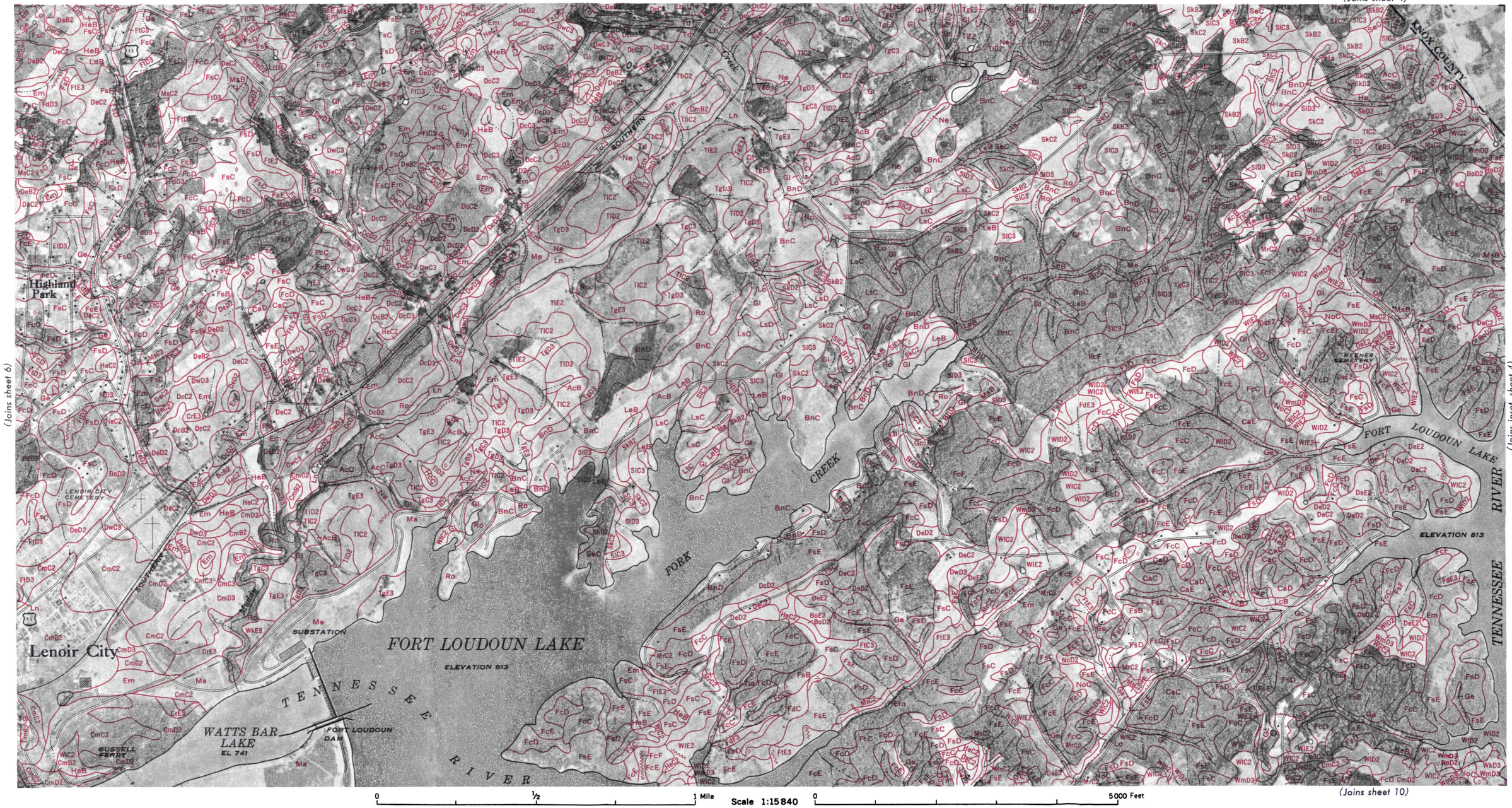
0 1 Mile ½

Scale 1:15840

0 5000 Feet

LOUDON COUNTY, TENNESSEE - SHEET NUMBER 7

(Joins sheet 4)



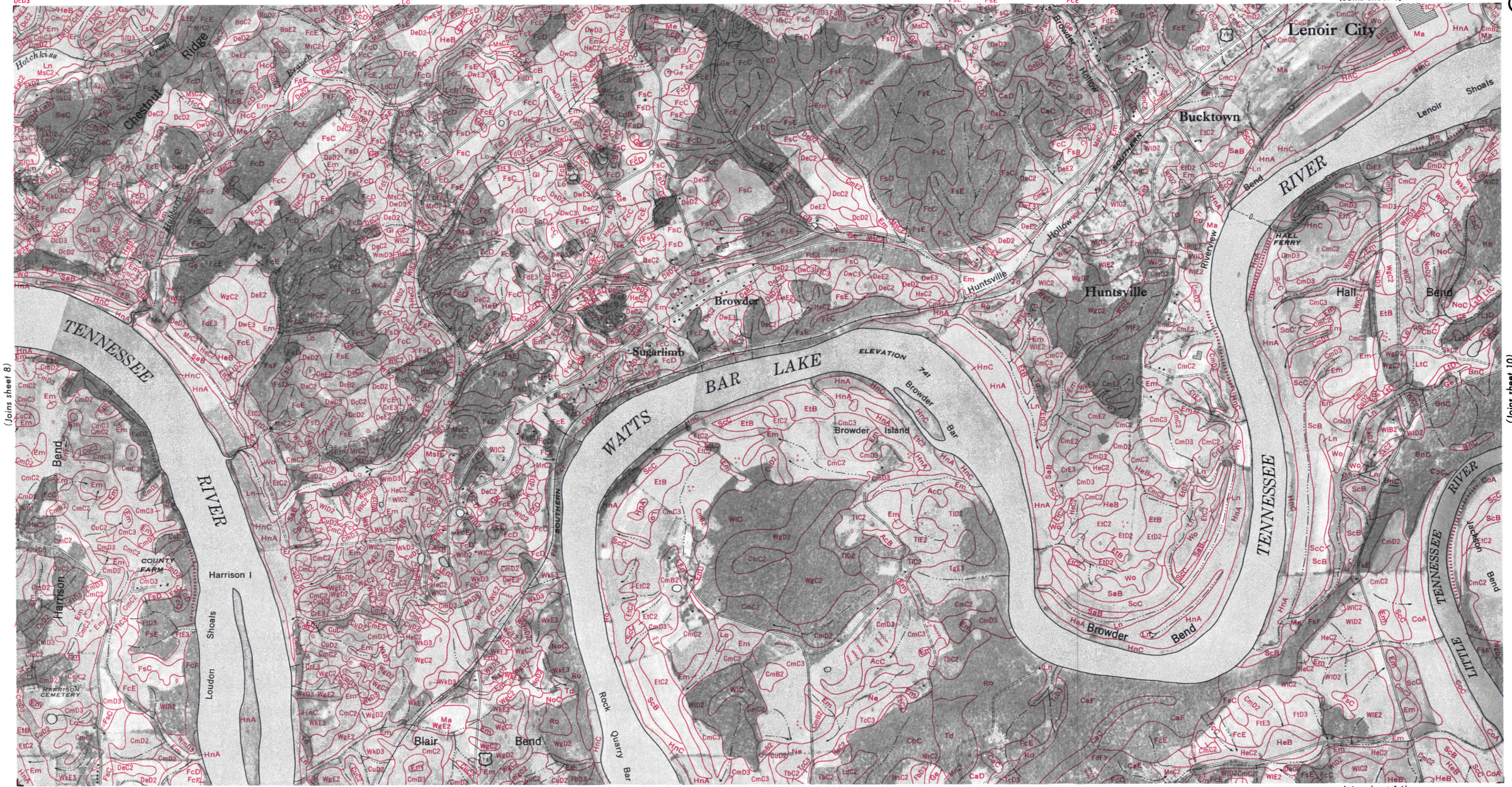
(Joins sheet 6)

(Joins inset, sheet 4)

(Joins sheet 10)

(Joins sheet 5)

LOUDON COUNTY, TENNESSEE - SHEET NUMBER 9



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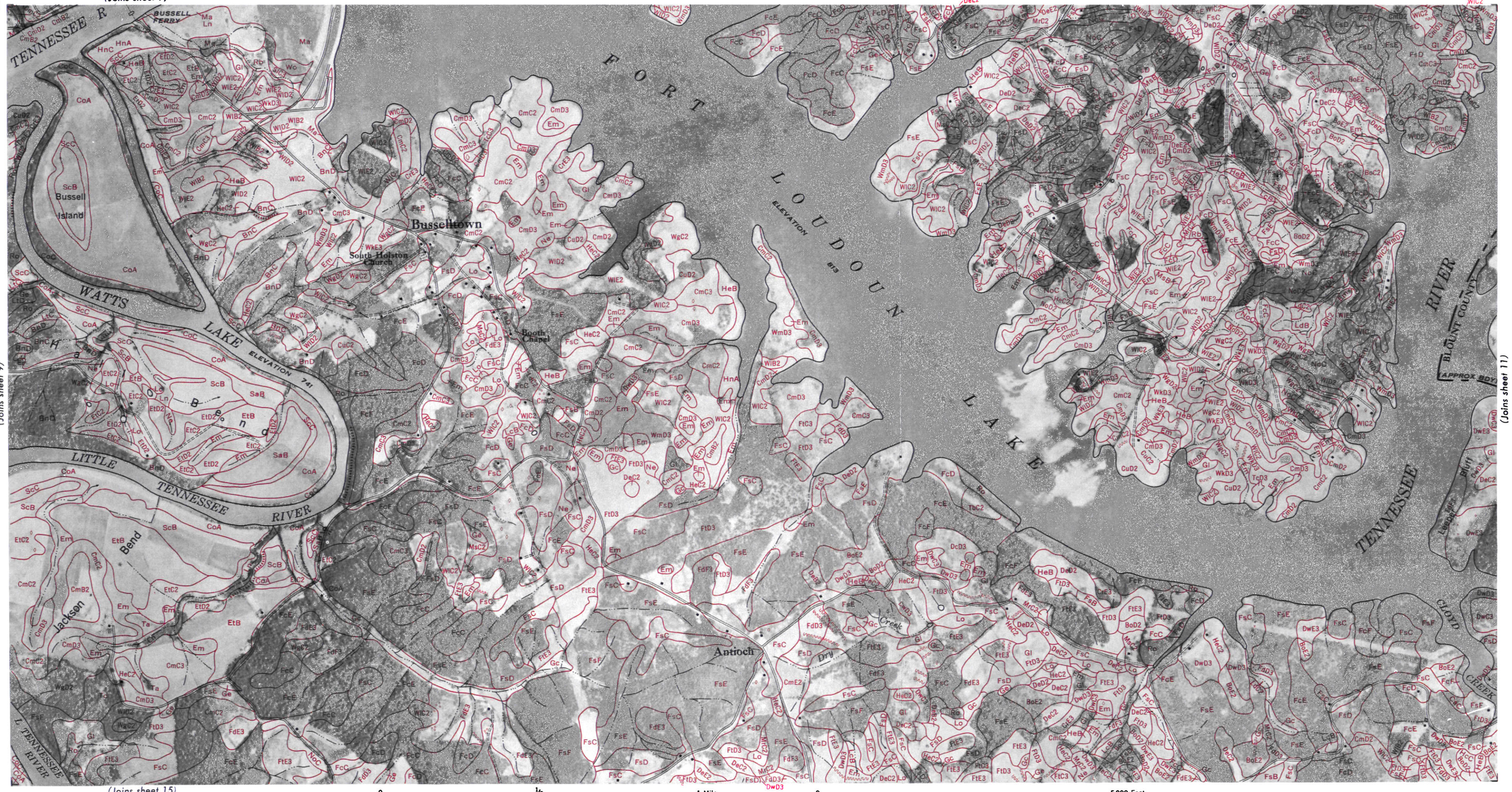
LOUDON COUNTY, TENNESSEE - SHEET NUMBER 10

(10)

(Joins sheet 7)



(Joins sheet 9)

(Joins sheet 11)

(Joins sheet 15)

0 1 Mile ½ Scale 1:15840 0 5000 Feet

(Joins inset, sheet 4)

(Joins sheet 10)

(Joins upper right)

(Joins lower left)

(Joins sheet 15)

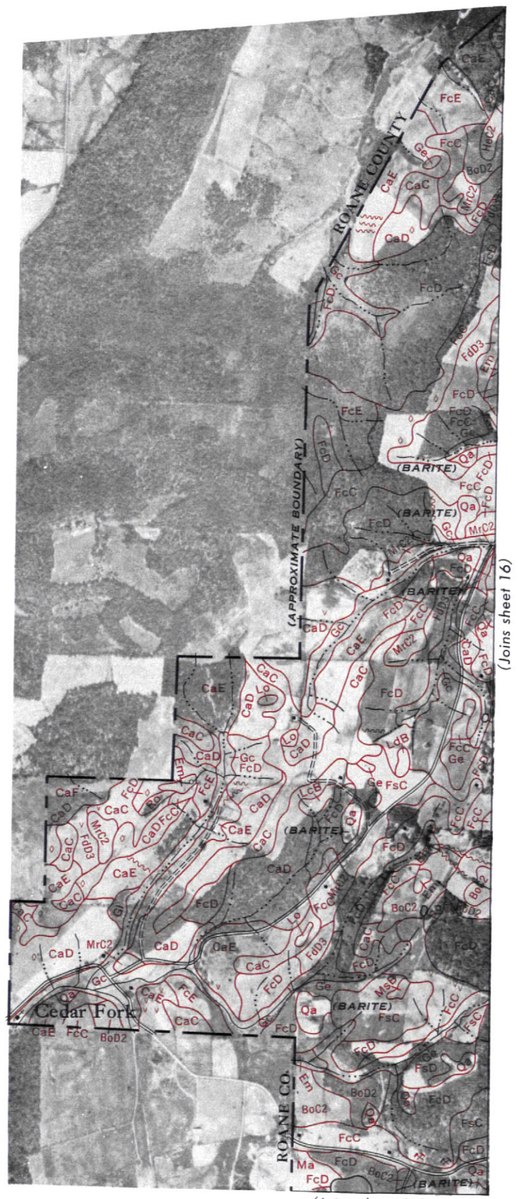
(Joins inset, sheet 25)

N

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet



0 ½ 1 Mile Scale 1:15840 0 5000 Feet

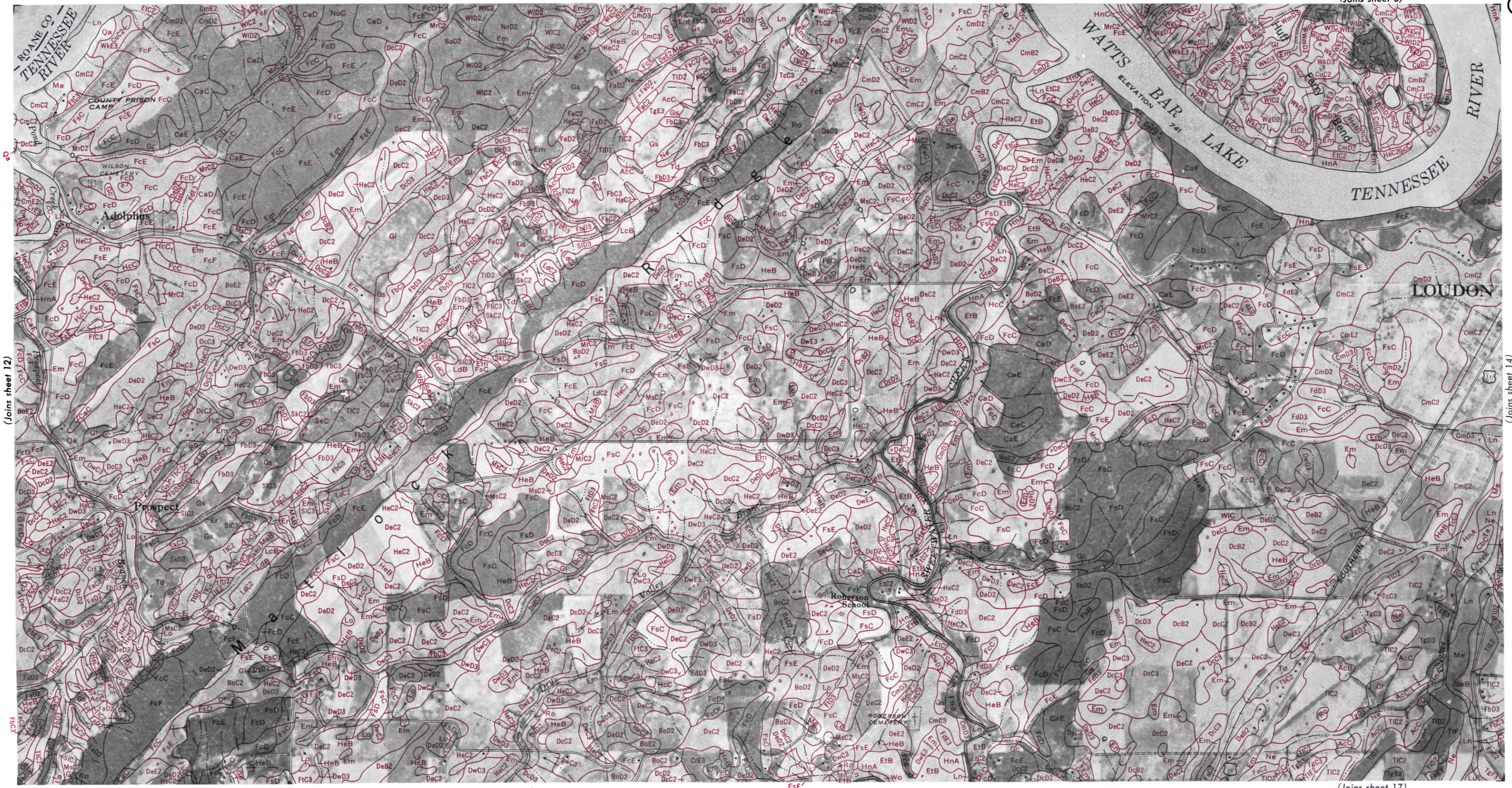
LOUDON COUNTY, TENNESSEE - SHEET NUMBER 13

(Joins sheet 8)

(Joins sheet 12)

(Joins sheet 14)

(Joins sheet 17)



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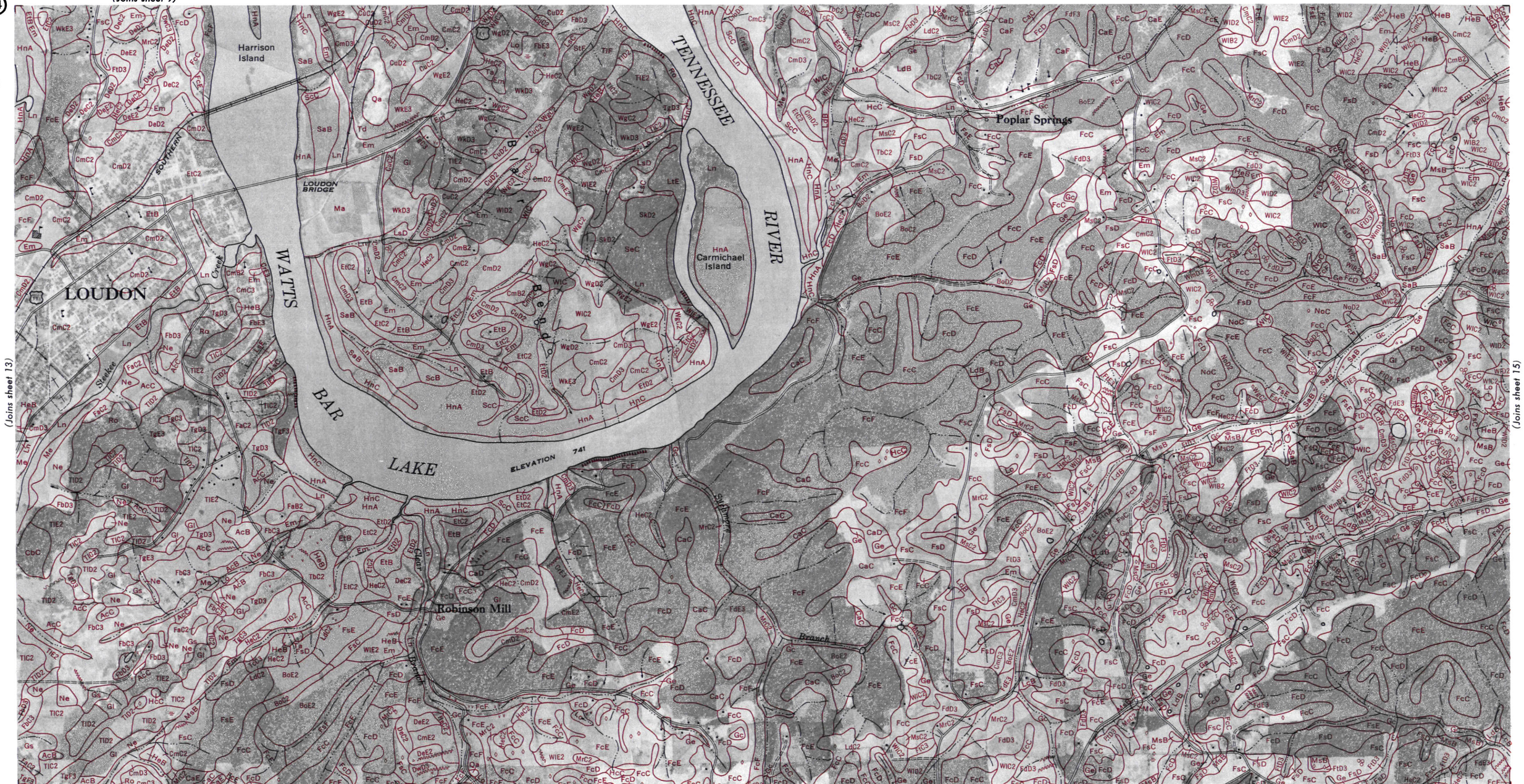
0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

LOUDON COUNTY, TENNESSEE - SHEET NUMBER 14

(Joins sheet 9)



(Joins sheet 13)

(Joins sheet 15)

(Joins sheet 18)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

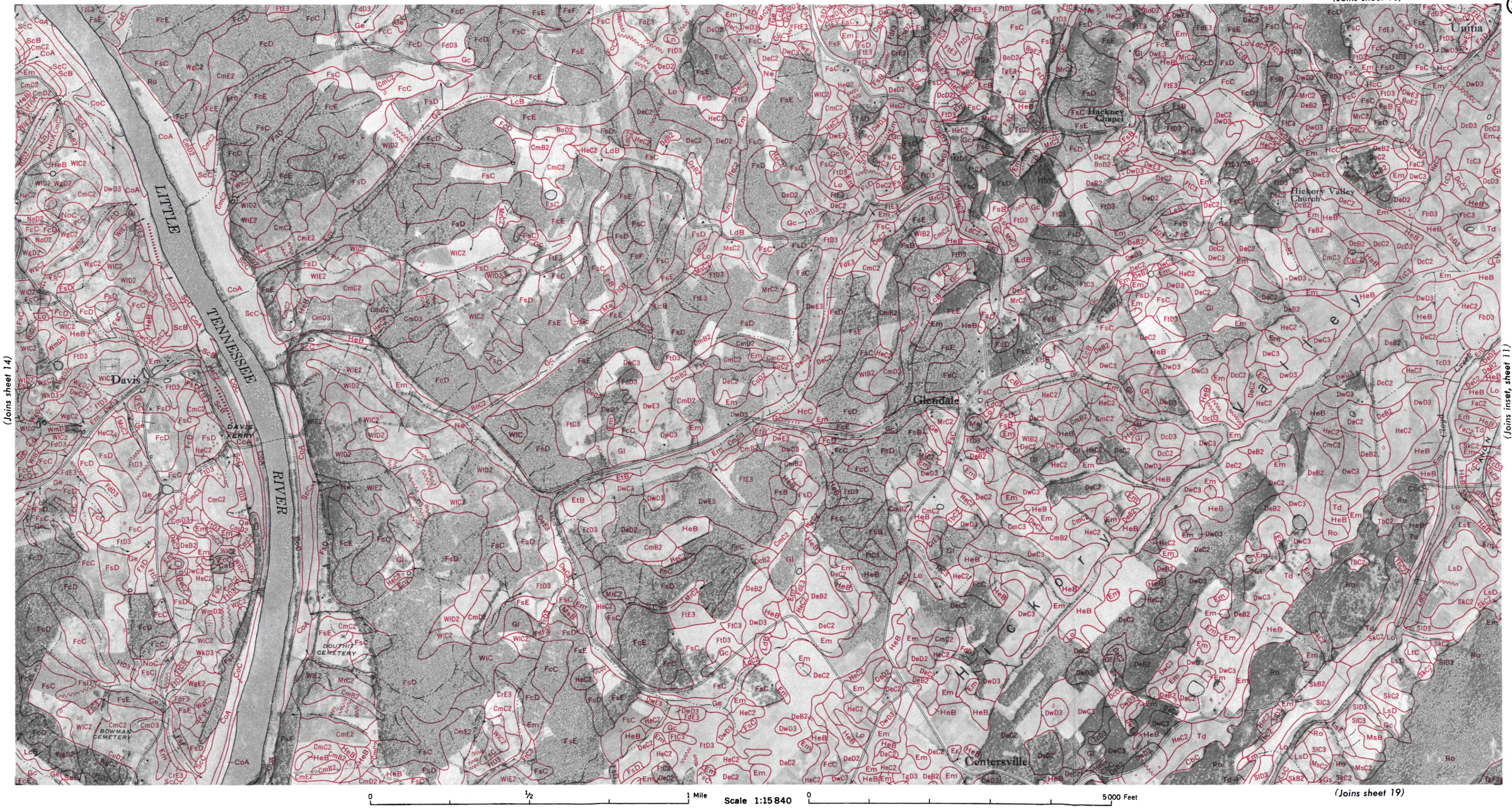
LOUDON COUNTY, TENNESSEE - SHEET NUMBER 15

(Joins sheet 10)

(Joins sheet 14)

(Joins inset, sheet 11)

(Joins sheet 19)



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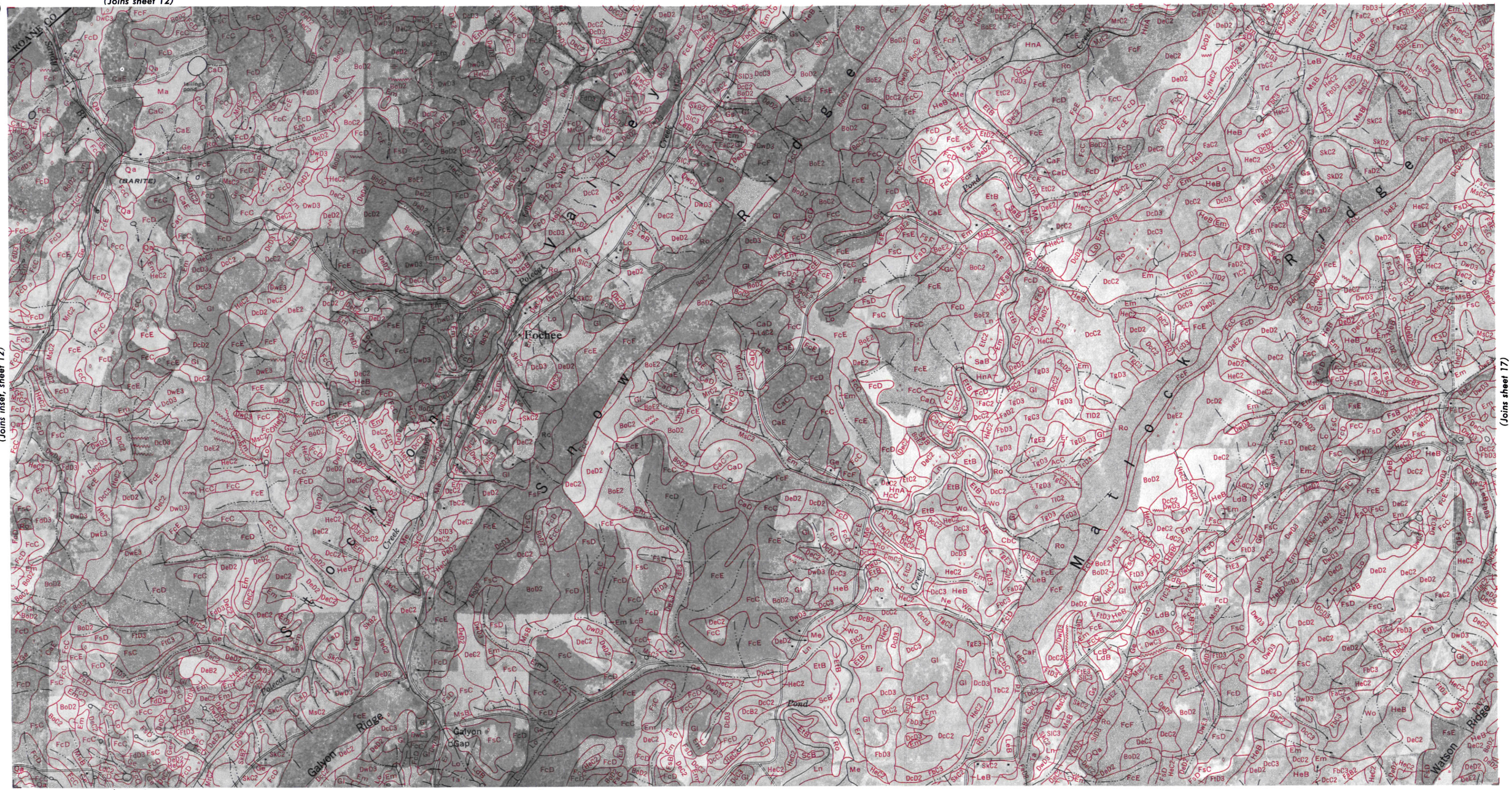
LOUDON COUNTY, TENNESSEE - SHEET NUMBER 16

16

(Joins sheet 12)



(Joins inset, sheet 12)

(Joins sheet 17)

(Joins sheet 21)

0 ½ 1 Mile

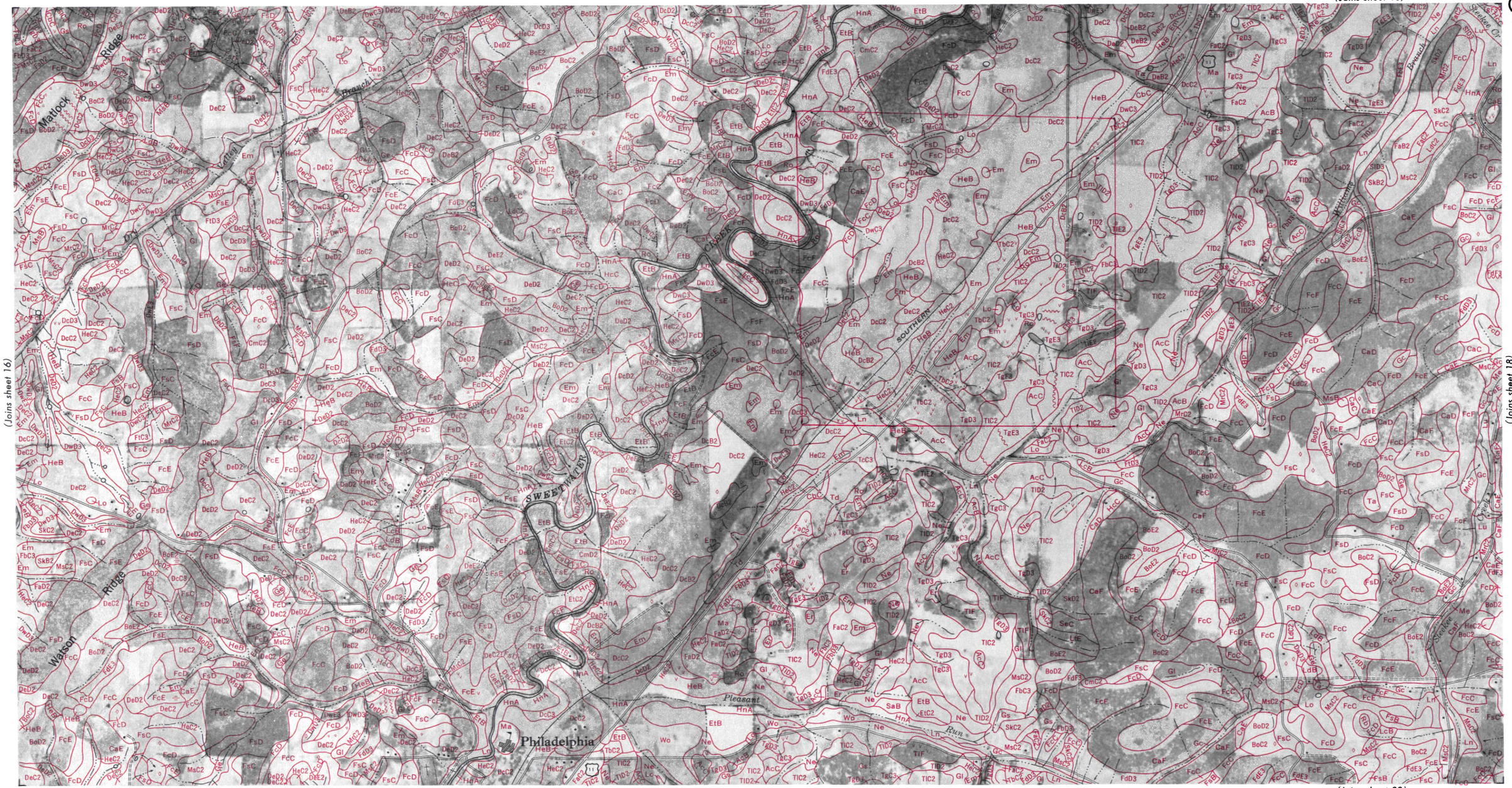
Scale 1:15840

0 5000 Feet

LOUDON COUNTY, TENNESSEE - SHEET NUMBER 17

(Joins sheet 13)

17



(Joins sheet 16)

(Joins sheet 18)

(Joins sheet 22)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

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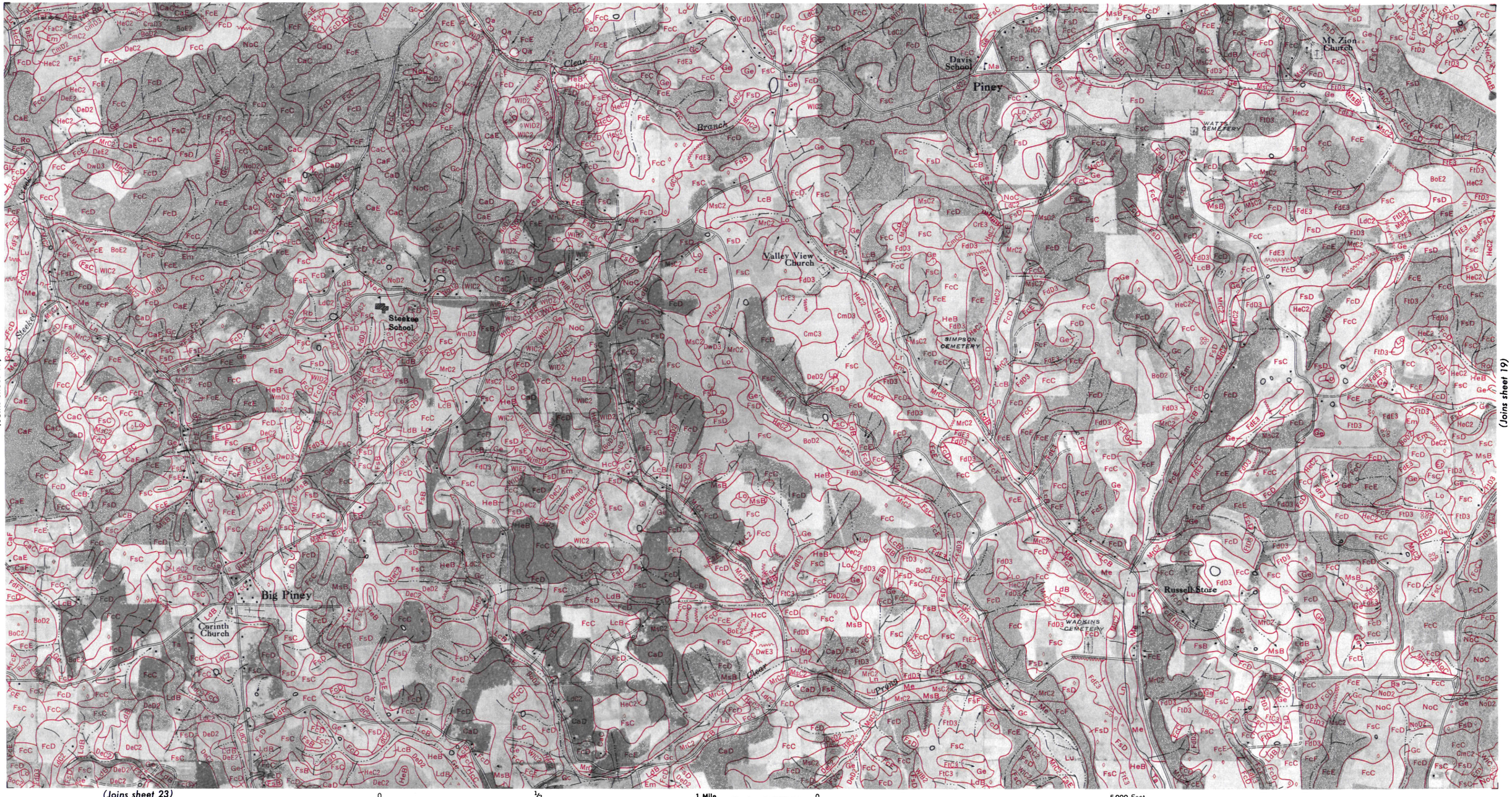
(Joins sheet 14)

(Joins sheet 17)

(Joins sheet 19)

(Joins sheet 23)



0 ½ 1 Mile

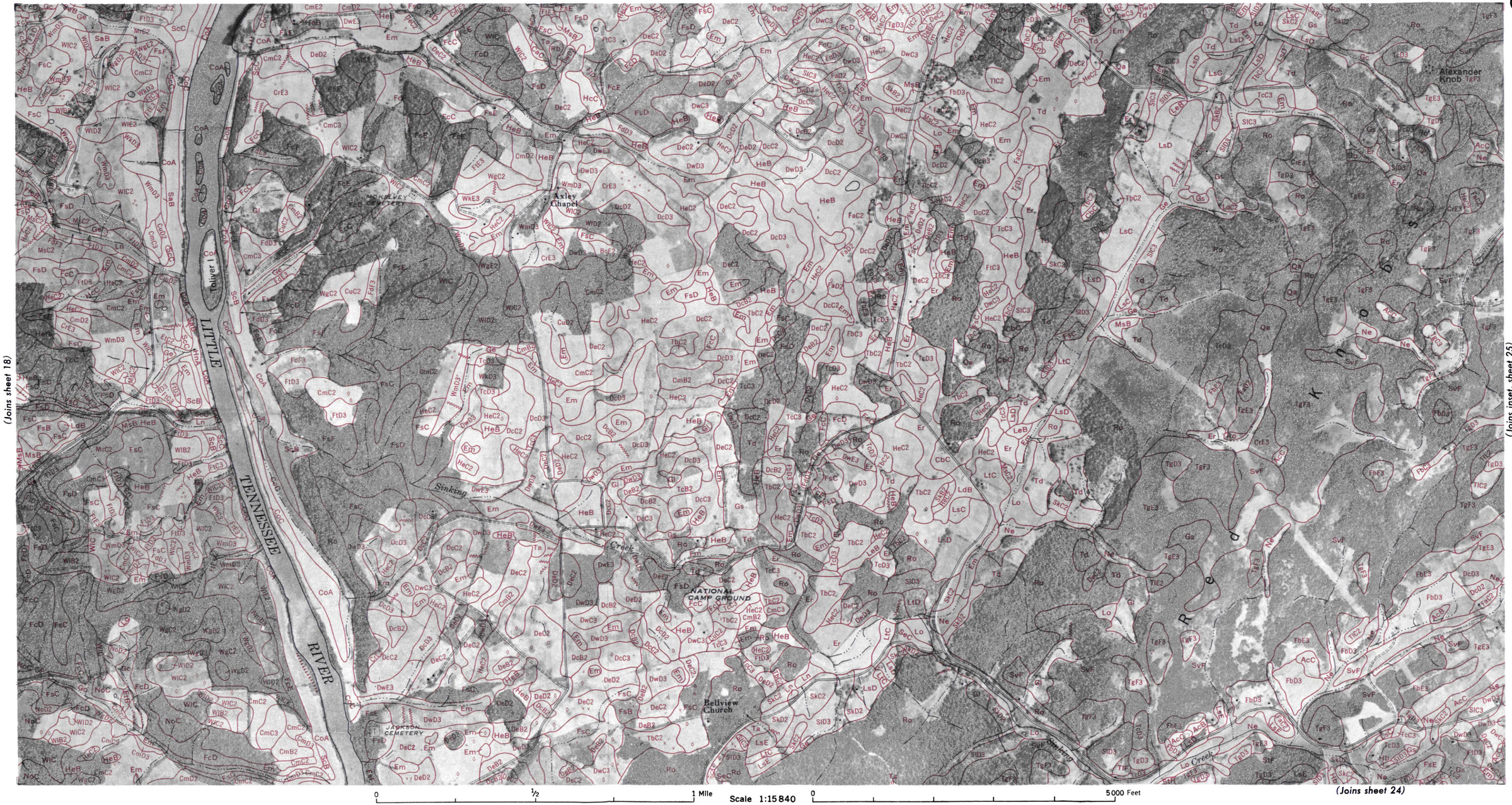
Scale 1:15840

0 5000 Feet

LOUDON COUNTY, TENNESSEE - SHEET NUMBER 19

(Joins sheet 15)

19



(Joins sheet 18)

(Joins inset, sheet 25)

(Joins sheet 24)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

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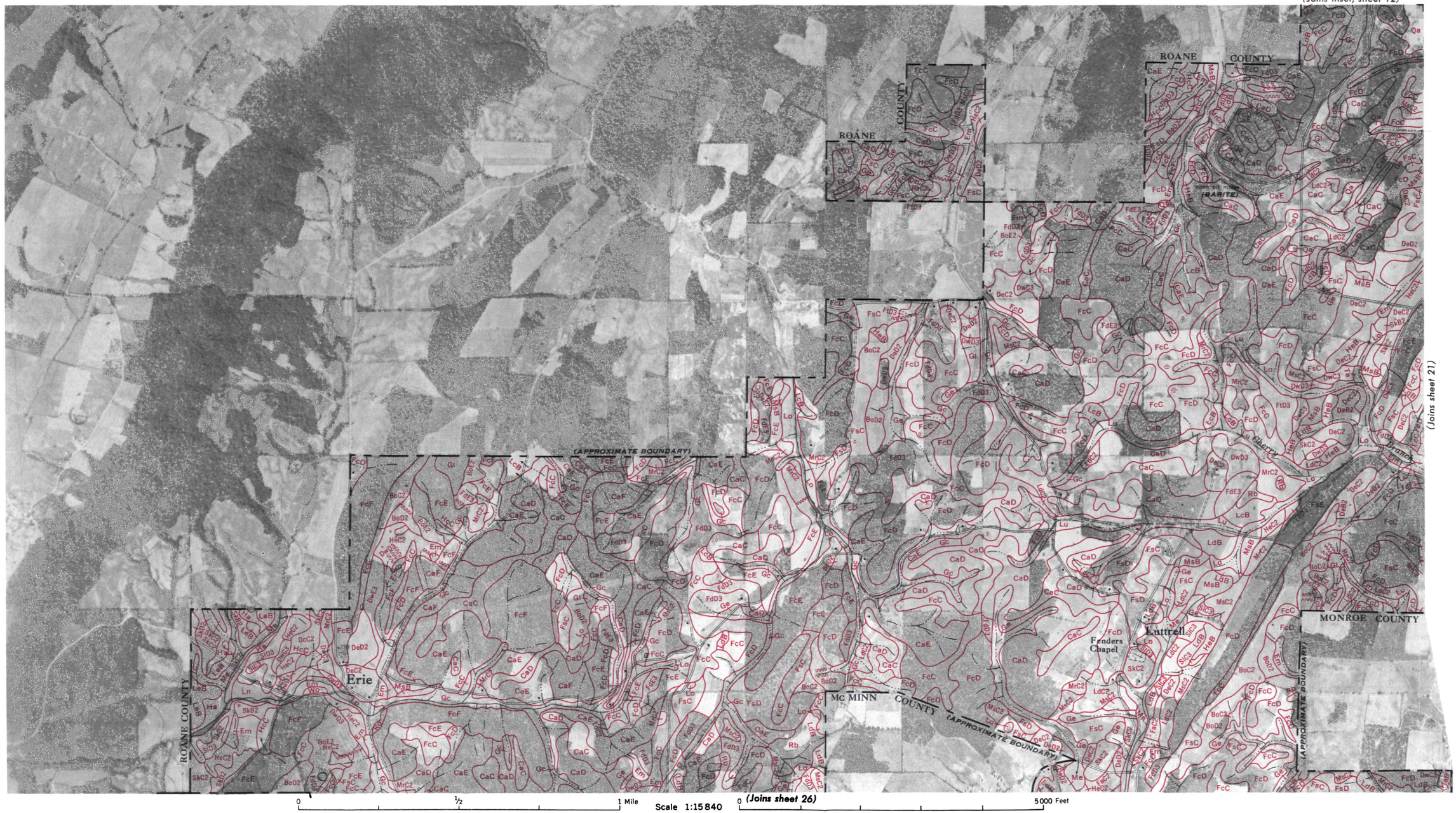
LOUDON COUNTY, TENNESSEE - SHEET NUMBER 20

(Joins inset, sheet 12)



(Joins sheet 21)

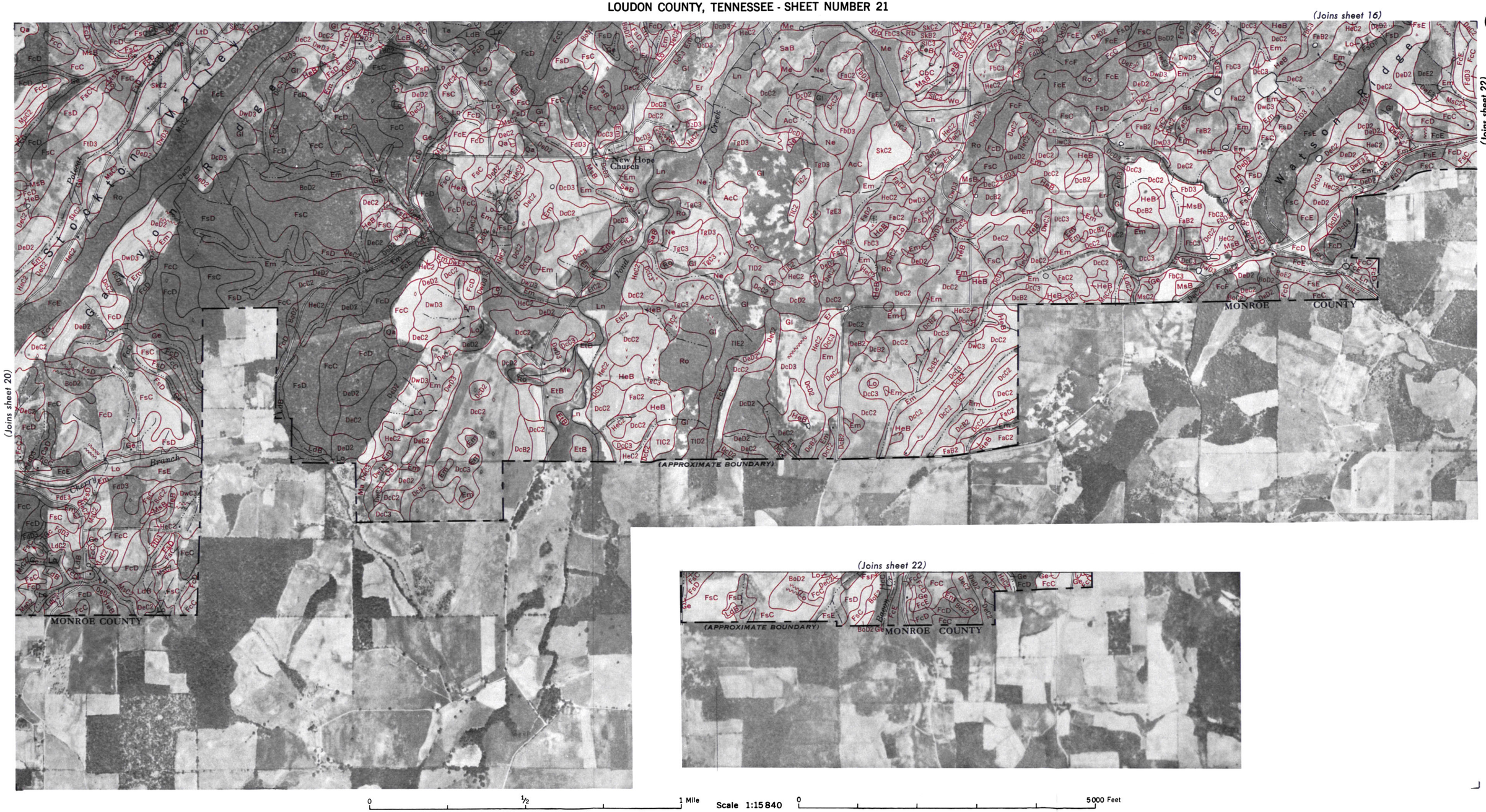
(Joins sheet 26)

0 ½ 1 Mile

Scale 1:15 840

0 5000 Feet

LOUDON COUNTY, TENNESSEE - SHEET NUMBER 21



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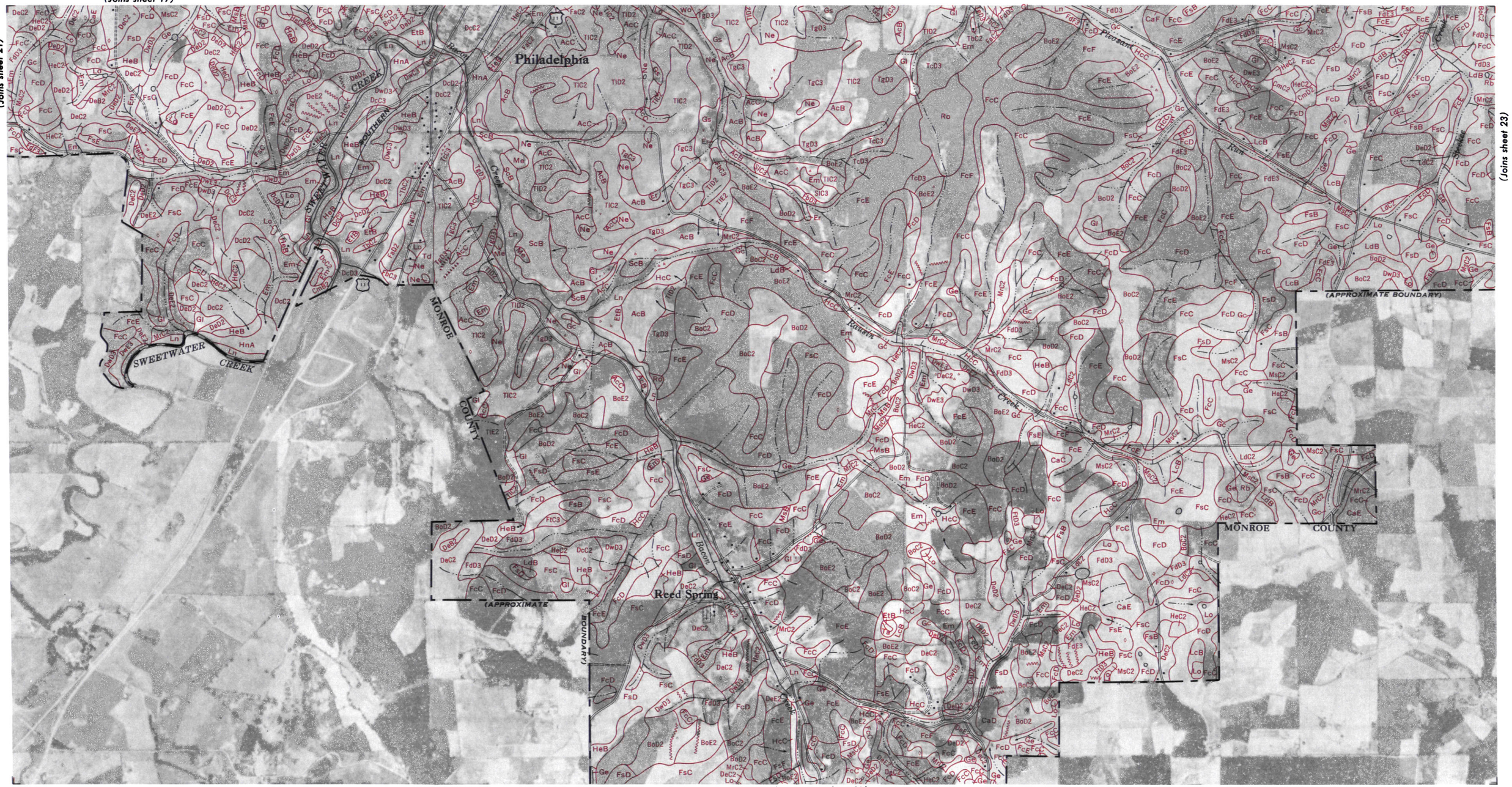
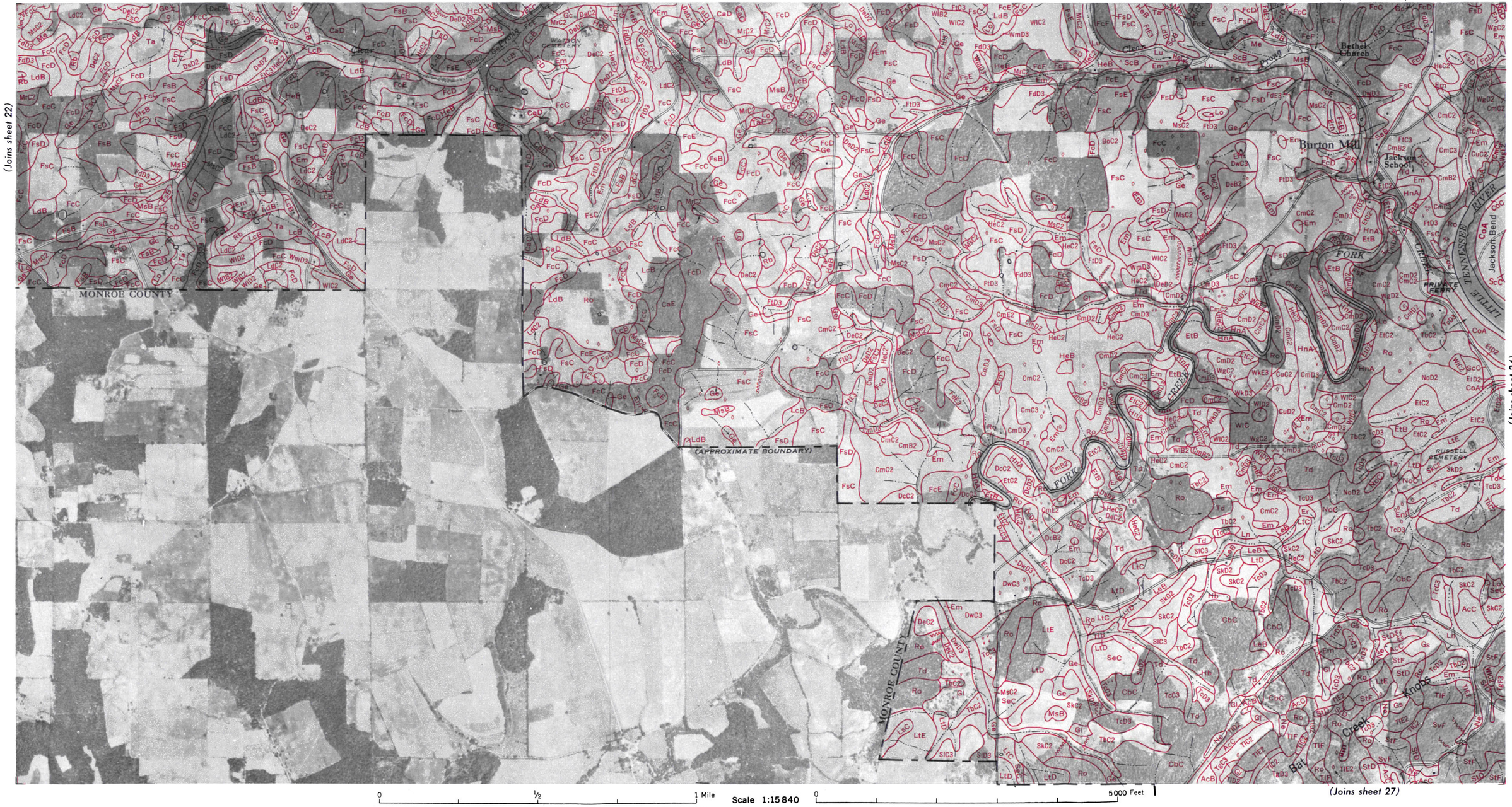
LOUDON COUNTY, TENNESSEE - SHEET NUMBER 22



LOUDON COUNTY, TENNESSEE - SHEET NUMBER 23

(Joins sheet 18)

23



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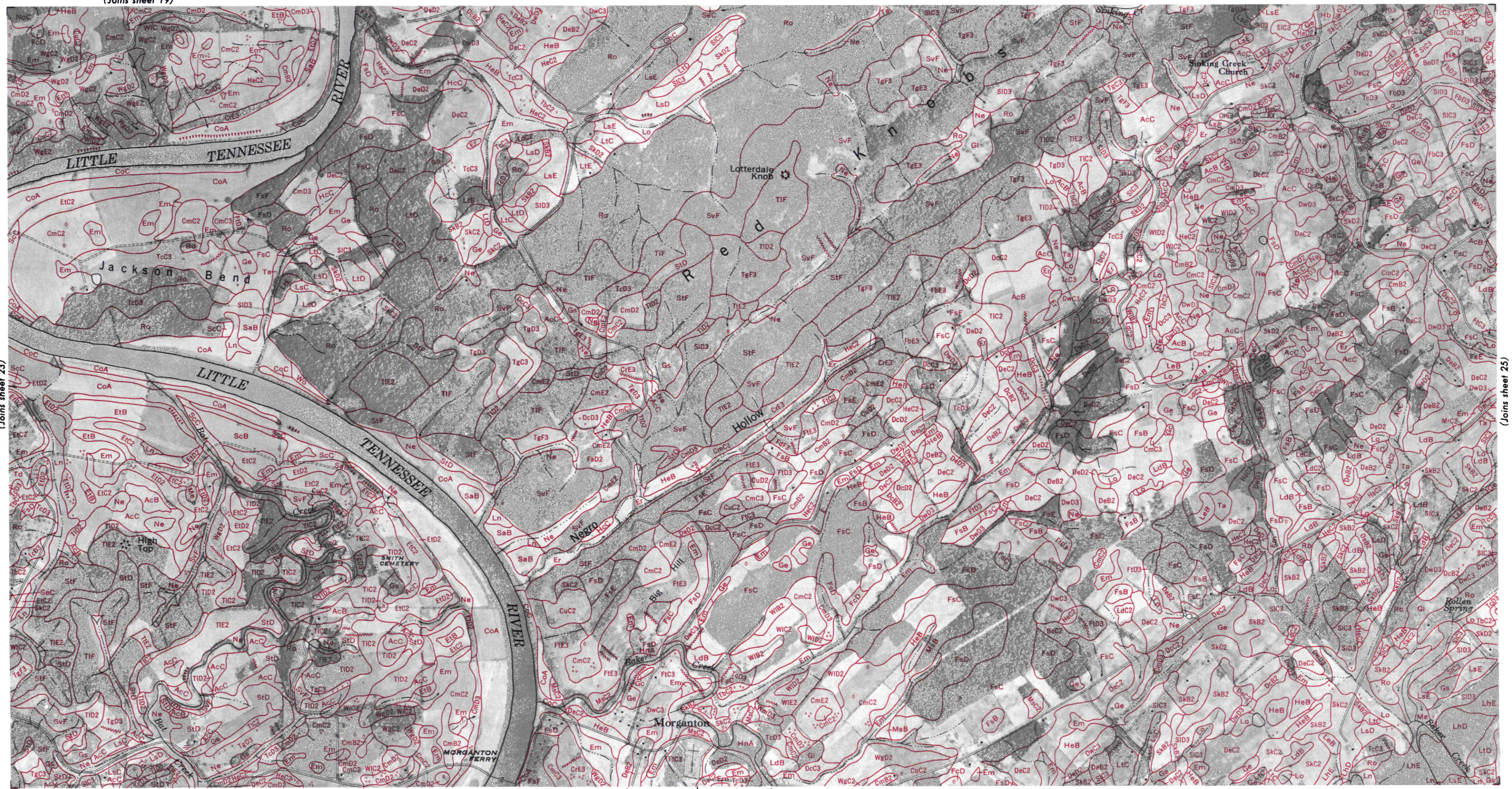
(24)

(Joins sheet 19)



(Joins sheet 23)

(Joins sheet 25)

½ (Joins sheet 27) | (Joins sheet 28)

0 1 Mile

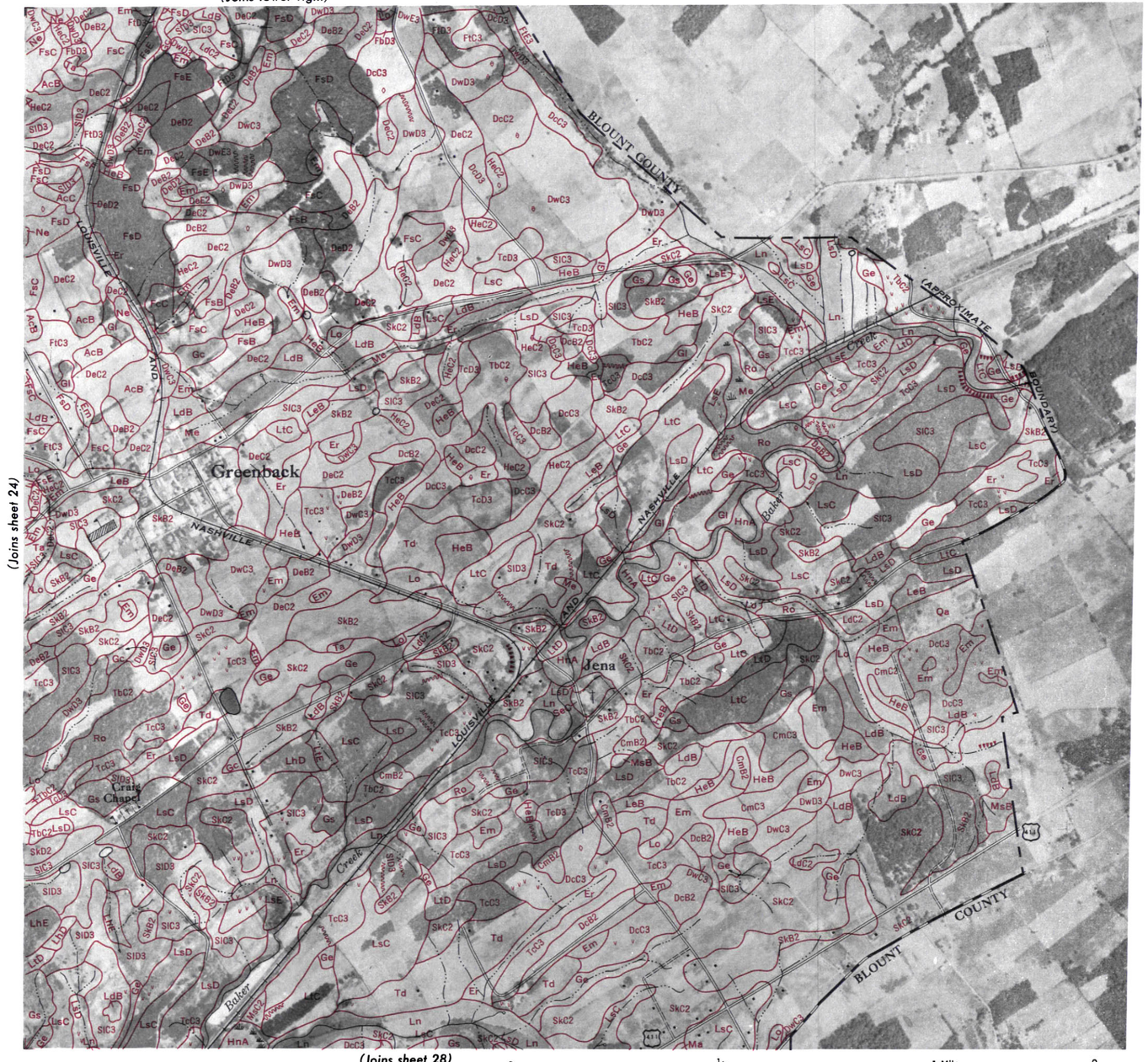
Scale 1:15840

0 5000 Feet

(Joins lower right)

(Joins inset, sheet 11)

(Joins sheet 24)



(Joins sheet 19)

(Joins sheet 28)

(Joins upper left)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

N

LOUDON COUNTY, TENNESSEE - SHEET NUMBER 26

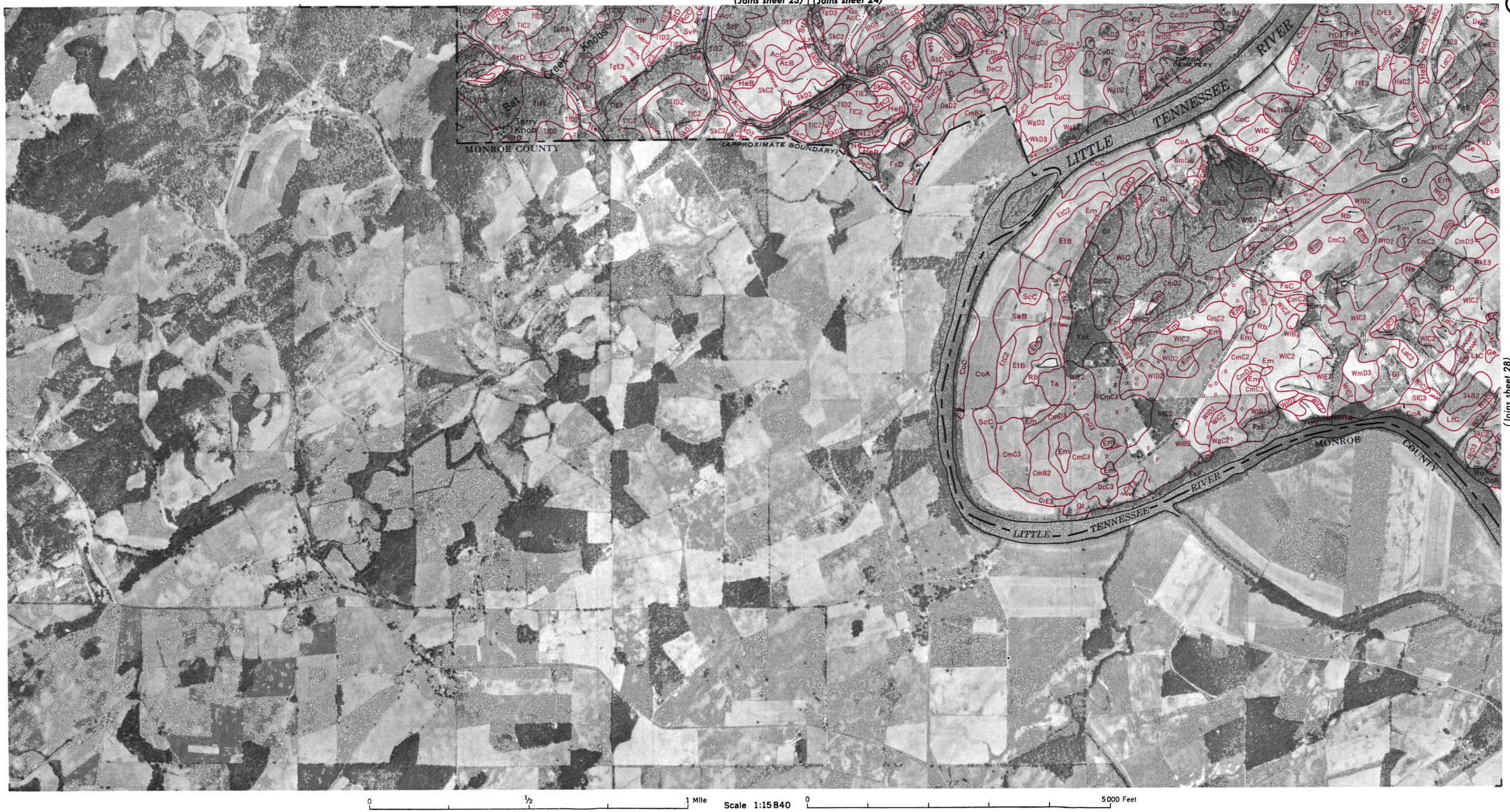
(Joins sheet 20)

(Joins sheet 20)

LOUDON COUNTY, TENNESSEE - SHEET NUMBER 27

(Joins sheet 23) (Joins sheet 24)

27



0 ½ 1 Mile Scale 1:15840 0 5000 Feet

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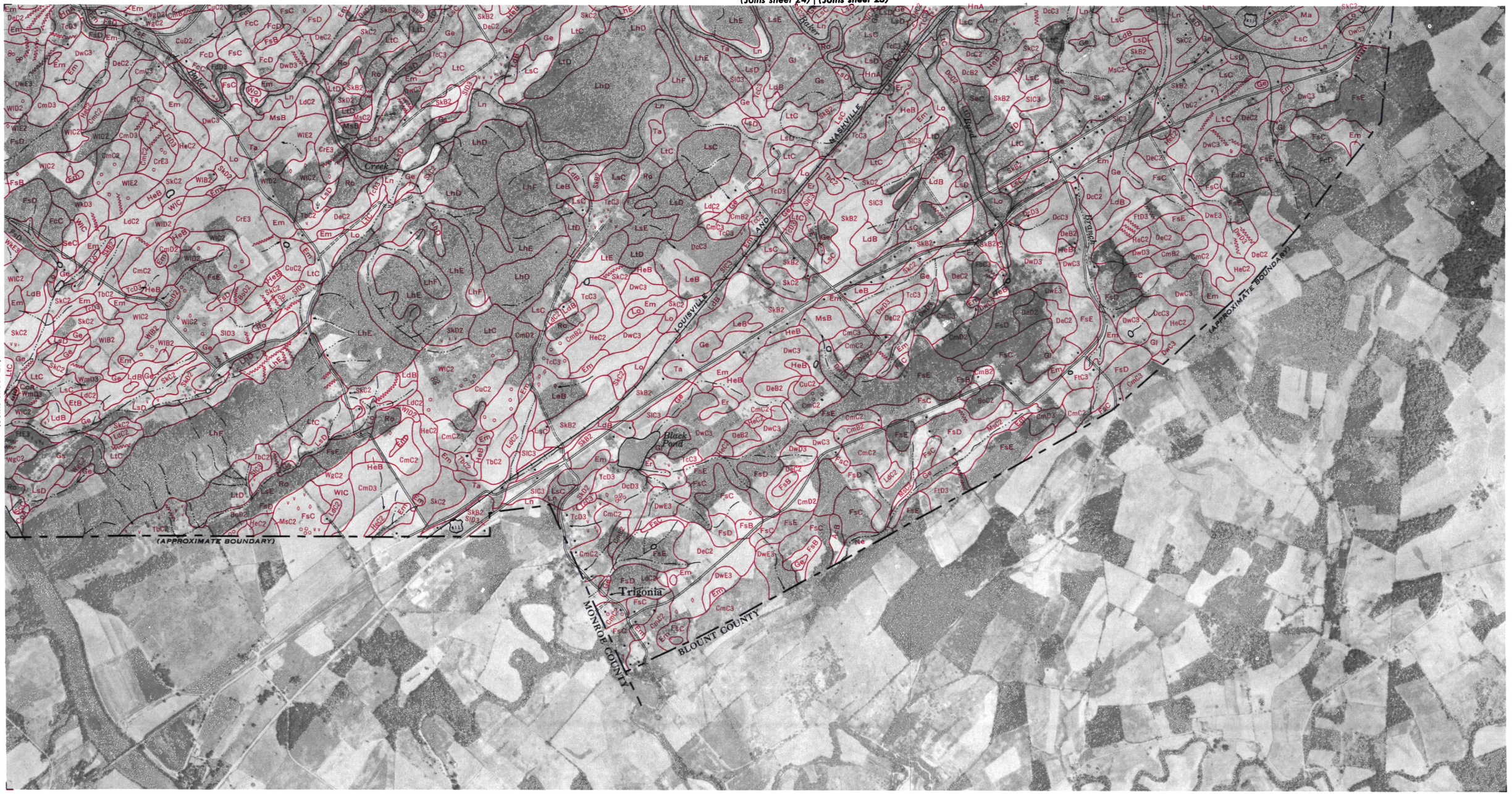
LOUDON COUNTY, TENNESSEE - SHEET NUMBER 28

(Joins sheet 24) | (Joins sheet 25)

28

N

(Joins sheet 27)



0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

LOUDON COUNTY, TENNESSEE
CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Roads

- Good motor
- Poor motor
- Trail
- Marker, U. S. — 33

Railroads

- Single track
- Multiple track
- Abandoned

Bridges and crossings

- Road
- Trail, foot
- Railroad
- Ferry
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings

- School
- Church
- Station

Mine and Quarry

- Dump

Pits, gravel or other

Power line

Pipeline

Cemetery

Dam

Levee

Tank

Oil well

BOUNDARIES

- National or state
- County
- Township, U. S.
- Section line, corner
- Reservation
- Land grant

DRAINAGE

Streams

- Perennial
- Intermittent, unclass.

Canals and ditches — CANAL / DITCH

Lakes and ponds

- Perennial
- Intermittent

Wells — flowing

Springs

Marsh

Wet spot

RELIEF

Escarpments

- Bedrock
- Other

Prominent peaks

Depressions

	Large	Small
Crossable with tillage implements		
Not crossable with tillage implements		
Contains water most of the time		

SOIL SURVEY DATA

- Soil type outline and symbol — Dx
- Gravel
- Stones
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Gullies